GE Healthcare

CARESCAPE™ V100 Vital Signs Monitor
Service Manual

CARESCAPE V100 Vital Signs Monitor
English
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1 Introduction

Revision history

Each page of this manual has a revision letter located at the bottom of the page. This letter identifies the revision level of the entire manual. This may be important if you have different manuals and you do not know which is the most current.

For the initial release, all pages have the revision letter A. For the second update, all pages receive the revision letter B. The latest letter of the alphabet added to the table below corresponds to the most current revision.

Revision	Comment
A	Initial release of the manual
B	Updated field-replaceable unit information.
C	Updated field-replaceable unit information and added content enhancements.
D	Revised manual to reflect revised addendum pn 2001005-202C. There are no content changes in the manual itself.

Manual purpose

This manual supplies technical information for service representatives and technical personnel so they can maintain the equipment to the assembly level. Use it as a guide for maintenance and electrical repairs considered field repairable. Where necessary the manual identifies additional sources of relevant information and technical assistance. See the operator's manual for the instructions necessary to operate the equipment safely in accordance with its function and intended use.

Intended audience

This manual is intended for service representatives and technical personnel who maintain, troubleshoot, or repair this equipment.

Ordering manuals

A paper copy of this manual will be provided upon request. Contact your local GE representative and request the part number on the first page of the manual.

Conventions used in this manual

Within this manual, special styles and formats are used to distinguish between terms viewed on screen, a button you must press, or a list of menu commands you must select:

- For technical documentation purposes, the abbreviation GE is used for the legal entity names, GE Medical Systems *Information Technologies,* Inc.
- In this manual, the CARESCAPE V100 vital signs monitor is referred to as the monitor.
- Names of hardware keys on the equipment are written in bold typeface: **Inflate/Stop**.
- Menu items are written in bold italic typeface: ***Monitor Setup***.
- Emphasized text is in *italic* typeface.
- Menu options or control settings selected consecutively are separated by the > symbol: ***Procedures > Cardiac Output***.
- When referring to different sections in this manual, section names are enclosed in double quotes: “Maintenance.”
- The word “select” means choosing and confirming.
- Messages (alarm messages, informative messages) displayed on the screen are written inside single quotes: '***Learning***.'
- Note statements provide application tips or other useful information.
- All illustrations in this manual are provided as examples only. They may not necessarily reflect your monitoring setup or data displayed on your monitor.
- Any names appearing in examples and illustrations are fictitious. The use of any real person’s name is purely coincidental.

Intended use

General use

- The monitor is intended to monitor one patient at a time in a clinical setting.

> CAUTION
> Federal law (U.S.A.) restricts this device to sale by or on the order of a physician.

- To ensure patient safety, use only parts and accessories manufactured or recommended by GE. Parts and accessories used shall meet the requirements of IEC 60601-1.
- Disposable devices are intended for single use only. They should not be reused.
- Periodically, and whenever the integrity of the monitor is in doubt, test all functions.

Safety information

The information presented in this section is important for the safety of both the patient and operator. This chapter describes how the terms Danger, Warning, Caution, and Note are used throughout the manual. In addition, standard equipment symbols are defined.

Responsibility of the manufacturer

GE is responsible for the effects on safety, reliability, and performance only if:

- assembly operations, extensions, readjustments, modifications, or repairs are carried out by persons authorized by GE;
- the electrical installation of the relevant room complies with the requirements of appropriate regulations; and
- the monitor is used in accordance with the instructions of use.

General

This device is intended for use under the direct supervision of a licensed health care practitioner.

This device is not intended for home use. Federal law (U.S.A.) restricts this device to be sold by or on the order of a physician.

Contact GE for information before connecting any devices to the equipment that are not recommended in this manual.

Parts and accessories used must meet the requirements of the applicable IEC/EN 60601 series safety standards, and/or the system configuration must meet the requirements of the IEC 60601-1-1 medical electrical systems standard.

Periodically, and whenever the integrity of the device is in doubt, test all functions.

The use of *accessory* equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration relating to the choice shall include:

- use of the accessory in the *patient vicinity*; and
- evidence that the safety certification of the *accessory* has been performed in accordance to the appropriate IEC 60601-1 and/or IEC 60601-1-1 harmonized national standard.

If the installation of the equipment, in the U.S.A., will use 240V rather than 120V, the source must be a center-tapped, 240V, single-phase circuit.

Dangers, warnings, cautions, and notes

The terms Danger, Warning, Caution and Note are used throughout this manual to point out hazards and to designate a degree or level or seriousness. Familiarize yourself with their definitions and significance. Hazard is defined as a source of potential injury to a person.

DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING indicates a potential hazard or unsafe practice which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTE provides application tips or other useful information to assure that you get the most from your equipment.

Product specific hazards

DANGER
Do not service the battery while the monitor is connected to external power.

WARNING
Do not immerse the monitor in water. If the monitor is splashed with water or becomes wet, wipe it immediately with a dry cloth.

WARNING
Do not immerse sensors in water, solvents, or cleaning solutions (the sensors and connectors are not waterproof).

WARNING
Do not perform any testing or maintenance on a sensor while it is being used to monitor a patient.

WARNING
Place the monitor on a rigid, secure surface or use the monitor with mounting hardware, poles, and stands recommended by GE.

WARNING
Only use the monitor in areas where adequate ventilation exists.

WARNING
Arrange the external AC/DC power converter, air hoses, and all cables carefully so they do not constitute a hazard.

WARNING
If powering the monitor from an external power adapter or converter, use only GE-approved power adapters and converters.

WARNING
The speaker is tested during unit power-up. If the power-up tones are not heard, audible alarms will also not be heard.

WARNING
If the Power-On Self Test fails, do not use the monitor.

WARNING
Inspect the device for damage prior to use.

WARNING
Do not disassemble, modify, or destroy the battery. Doing so can cause battery fluid leakage, heat generation, fire, and/or explosion.

WARNING
Do not incinerate the battery or store it at high temperatures. Doing so may cause the battery to explode.

WARNING
Do not short-circuit the battery terminals by directly connecting the metal terminals together. Be certain that no metal objects (e.g., coins, paper clips, etc.) touch both battery terminals simultaneously. Doing so can cause the battery to overheat and/or explode, resulting in possible caustic burns and/or battery damage.

WARNING
Do not use any battery other than a GE-recommended battery. Other batteries may not provide the same operating time and may cause unexpected monitor shutdown. Other batteries may be incompatible with the internal charger and may cause battery acid leakage, fire, or explosion.

WARNING
The battery will completely discharge if the monitor is stored for a prolonged period of time with the battery left inside and not periodically recharged. Configuration settings may be lost as a result.

WARNING
Charge the battery pack with the monitor's internal charger only. Use of an unrecommended charger may cause battery fluid leakage, overheating of the battery, and possible explosion.

WARNING
The electromagnetic compatibility profile of the monitor may change if accessories other than those specified for use with the monitor are used. Please refer to the Accessories list provided with your monitor.

WARNING
Use only accessories approved for use with the monitor. Failure to use recommended accessories may result in inaccurate readings.

WARNING
Use of portable phones or other radio frequency (RF) emitting equipment near the monitor may cause unexpected or adverse operation.

WARNING
Verify calibration of NIBP parameter (temperature and pulse oximeter do not require calibration; refer to the "Maintenance" section for instructions). Ensure that the display is functioning properly before operating the monitor.

WARNING
Keep the Exergen scanner secured when it is not in use.

WARNING
Failure on the part of the responsible individual, hospital or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

WARNING
The use of accessories, transducers, and cables other than those specified may result in increased emissions and/or increased susceptibility to electromagnetic interference. This may result in impaired operation of the monitor and/or devices in the area, leading to inaccurate readings or loss of operation.

CAUTION
To avoid personal injury, do not perform any servicing unless qualified to do so.

CAUTION
The equipment or system should not be used adjacent to, or stacked with, other equipment. If adjacent or stacked use is necessary, the equipment or system should be tested to verify normal operation in the configuration in which it is being used.

CAUTION
Magnetic and electrical fields are capable of interfering with the proper performance of the monitor. For this reason make sure that all external devices operated in the vicinity of the monitor comply with the relevant EMC requirements.

CAUTION
The monitor does not include any user-replaceable fuses. Refer servicing to qualified service personnel.

CAUTION
Do not use replacement batteries other than the type supplied with the monitor. Use only batteries recommended by GE. Other batteries could result in monitor shutdown. Replacement batteries are available from GE.

CAUTION
The monitor is designed to conform to Electromagnetic Compatibility (EMC) standard IEC 60601-1-2 and will operate accurately in conjunction with other medical equipment which also meets this requirement. To avoid interference problems affecting the monitor, do not use the monitor in the presence of equipment which does not conform to these specifications.

CAUTION
Do not exceed a load weighing 5 lbs. (2.7 kg) in the accessory basket.

CAUTION
The monitor meets standards IEC 60601-1 and ISO 9919 for shock and vibration. If the monitor is subjected to conditions exceeding these standards, performance may be degraded.

CAUTION
The performance of the monitor may be degraded if it is operated or stored outside of the environmental conditions specified in this manual.

CAUTION
To prevent cross-contamination, clean exterior surfaces of the monitor, monitor accessories, and reusable sensors on a regular basis in compliance with your institution's infection control unit and/or biomedical department's local policy.

CAUTION
Do not sterilize the monitor by irradiation, gas-, heat- or chemical-based sterilization.

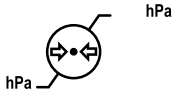
NOTE
This equipment is suitable for use in the presence of electrosurgery.

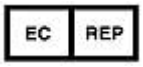
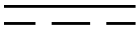
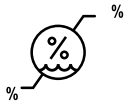
NOTE
Medical electrical equipment requires special electromagnetic compatibility (EMC) precautions which must be considered when installing and putting this equipment into operation. For detailed information, refer to the Electromagnetic compatibility (EMC) appendix in this manual.

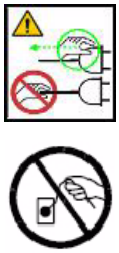
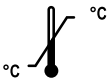
Equipment symbols

The following symbols are associated with the CARESCAPE V100 vital signs monitor.

NOTE
The model of the monitor determines which symbols appear on it.

	Alarms Silence
	Atmospheric pressure limitations.
	Attention, consult accompanying documents
	Battery Power
	Classified with respect to electric shock, fire, and mechanical and other specified hazards only in accordance with CAN/CSA C22.2 No. 601.1 and UL 2601-1 (UL 60601-1). Also evaluated to IEC 60601-2-30.

CE	This product conforms with the essential requirements of the Medical Device Directive 93/42/EEC. Accessories without the CE mark are not guaranteed to meet the Essential Requirements of the Medical Device Directive.
	Charging
	Class II equipment
	Consult instructions for use.
	Defibrillator-proof type BF equipment
	European authorized representative
	External communications port connector
	External DC power input
	Fragile. Handle with care.
	Humidity limitations.
IPX0	Ordinary Equipment (Exergen only)
IPX1	This product is protected against vertically falling drops of water and conforms with the IEC 60529 standard at level of IPX1. No harmful effects will come of vertically falling drops of water making contact with the monitor.
	Manufacturer: This symbol is accompanied by the name and the address of the manufacturer.
	Manufacturing Date: This symbol is accompanied by the date of the manufacturing.

	CAUTION — Safety ground precaution. Remove power cord from the mains source by grasping the plug. *Do not* pull on the cable.
REF	Catalog or orderable part number.
ME20	Russia only. GOST-R mark.
Rx ONLY	Prescriptive Device. USA only. For use by or on the order of a Physician, or persons licensed by state law.
SN	Device serial number.
	The PSE mark (Product Safety Electric Appliance and Materials) is a mandatory mark required on Electrical Appliances in Japan as authorized by the Electrical Appliance and Material Safety Law (DENAN). This mark signifies that a product complies with the law according to a set of standards for electric devices.
	Temperature limitations.
	WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE): This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment

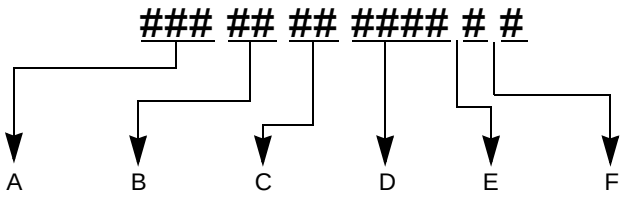
Service requirements

Follow the service requirements listed below.

- Refer equipment servicing to GE-authorized service personnel only.
- Any unauthorized attempt to repair equipment under warranty voids that warranty.
- It is the user's responsibility to report the need for service to GE or to one of GE's authorized agents.
- Failure on the part of the responsible individual, hospital or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.
- Regular maintenance, irrespective of usage, is essential to ensure that the equipment will always be functional when required.

Equipment ID

Every GE device has a unique serial number for identification. A sample of the information found on a serial number label is shown below.



	Description
A	product code[1]
B	year manufactured
C	fiscal week manufactured
D	production sequence number
E	manufacturing site
F	miscellaneous characteristic, indicating prototype, refurbish, etc.

1. The current CARESCAPE V100 Vital Signs Monitor product codes are SDT or SH6.

Related manuals

Manual	Title
2010566	Host Communications Reference Manual. Contact your GE sales representative or distributor.
2048723-001	CARESCAPE V100 Vital Signs Monitor Operator's Manual (English). Contact your GE sales representative for information on other available languages.

Service policy

The warranty for this product is enclosed with the product in the shipper carton. All repairs on products under warranty must be performed or approved by Product Service personnel. Unauthorized repairs will void the warranty. Only qualified electronics service personnel should repair products not covered by warranty.

Service contracts

Extended warranties can be purchased on most products. Contact your Sales Representative for details and pricing.

Assistance

If the product fails to function properly, or if assistance, service or spare parts are required, contact Customer Support. Before contacting Customer Support, it is helpful to attempt to duplicate the problem and to check all accessories to ensure that they are not the cause of the problem. If you are unable to resolve the problem after checking these items, contact GE. Prior to calling, please be prepared to provide:

- product name, model number, and serial number
- a complete description of the problem

If repair parts or service are necessary, you will also be asked to provide:

- the facility's complete name, address, and account number
- a purchase order number if the product needs repair or when you order spare parts
- the facility's GE account number, if possible
- the appropriate part number for spare or replacement parts

Service

If your product requires warranty, extended warranty or non-warranty repair service, contact GE Technical Support or contact your local GE representative. To facilitate prompt service in cases where the product has external chassis or case damage, please advise the representative when you call.

The representative will record all necessary information and will provide a Return Authorization Number. Prior to returning any product for repair, a Return Authorization Number must be obtained.

Packing instructions

If you have to return goods for service, follow these recommended packing instructions.

- Remove all hoses, cables, sensors, and power cords from the monitor before packing.
- Pack only the accessories you are requested to return; place them in a separate bag and insert the bag and the product inside the shipping carton.
- Use the original shipping carton and packing materials, if available.
- Observe the environmental conditions detailed in the "Specifications" on page A-2.
- It is recommended that all returned goods be insured. Claims for loss or damage to the product must be initiated by the sender.

If the original shipping carton is not available:

- Place the product in a plastic bag and tie or tape the bag to prevent loose particles or materials from entering openings such as hose ports.
- Use a sturdy corrugated container to ship the product; tape securely to seal the container for shipping.
- Pack with at least 4 inches of padding on all sides of the product.

Insurance

Insurance is at the customer's discretion. The shipper must initiate claims for damage to the product.

Repair parts

To order parts, contact Service Parts at the address or telephone number listed on the "How To Reach Us..." page found in the front of this manual.

Please allow one working day for confirmation of your order. All orders must include the following information.

- Facility's complete name, address, and phone number
- FAX number
- Your purchase order number
- Your GE account number

Disposal of product waste

As you use the monitor, you will accumulate solid wastes that require proper disposal or recycling. These include batteries, patient applied parts, and packaging material. Dispose of these materials according to local or national regulations.

Batteries

WARNING
Do not incinerate the battery or expose it to fire or high temperatures. Doing so may cause the battery to explode.

The sealed, rechargeable main battery contains lead and can be recycled.

The rechargeable battery is of the sealed lead-acid form. Discharge this battery prior to disposal. Place the battery in packaging which electrically isolates its contents. Do not puncture or place the battery in a trash compactor. Dispose any battery in accordance with regional body controlled guideline.

Patient applied parts

Certain patient applied parts, such as those with adhesive (disposable SpO_2 sensors), are intended for single use and should be disposed of properly as medical waste in accordance with regional body controlled guideline.

Other patient applied parts, such as blood pressure cuffs, should be cleaned according to instructions. Inspect reusable applied parts for wear, replace as necessary, and dispose of used product as medical waste in accordance with regional body controlled guideline.

Packaging material

Retain original packaging materials for future use in storing or shipping the monitor and accessories. This recommendation includes corrugated shippers and foam/corrugated spacers.

If you decide to dispose of these materials, we recommend recycling them.

Monitor

At the end of its service life, the product described in this manual, as well as its accessories, must be disposed of in compliance with the guidelines regulating the disposal of such products. If you have questions concerning disposal of the product, please contact GE or its representatives.

2 Equipment overview

Equipment description

The CARESCAPE V100 vital signs monitor provides a small, portable, easy-to-use monitoring alternative for sub-acute hospital and non-hospital settings. The monitor is for use on adult, pediatric, or neonatal patients—one at a time. The battery-operated monitor offers noninvasive determination of systolic blood pressure, diastolic blood pressure, mean arterial pressure, pulse rate, oxygen saturation, and temperature. Monitors are available with or without integrated printers as well as the following parameters and technologies.

- NIBP, Pulse: SuperSTAT, Auscultatory, Classic
- SpO_2: Ohmeda TruSignal, Nellcor OxiMax, or Masimo SET
- Temperature: Alaris Turbo Temp, Alaris Tri-Site, or Exergen

The model of the CARESCAPE V100 vital signs monitor determines which parameters are in your monitor. Please refer to applicable sections.

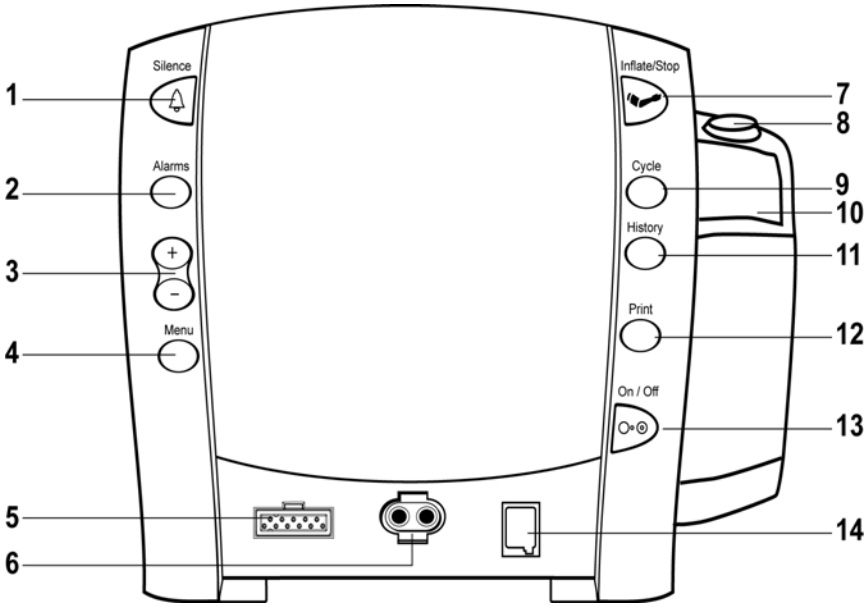
Using the CARESCAPE V100 vital signs monitor, a clinician can measure, display, and record patient vital sign data that is derived from each parameter. The monitor is also capable of alerting the clinician to changes in the patient's condition or when it is unable to effectively monitor the patient's condition. All of the main operations of the CARESCAPE V100 vital signs monitor are easy-to-use and only a button-touch away. Please review the factory default settings and, where applicable, enter settings appropriate for your use.

Product configurations

Each CARESCAPE V100 vital signs monitor is supplied with an accessory pack. The contents of the pack vary according to model. Unpack the items carefully. If an accessory is missing or if an item is in a nonworking condition, contact GE Customer Service immediately.

It is recommended that all the packaging be retained, in case the monitor must be returned for service in the future.

Front controls and connectors

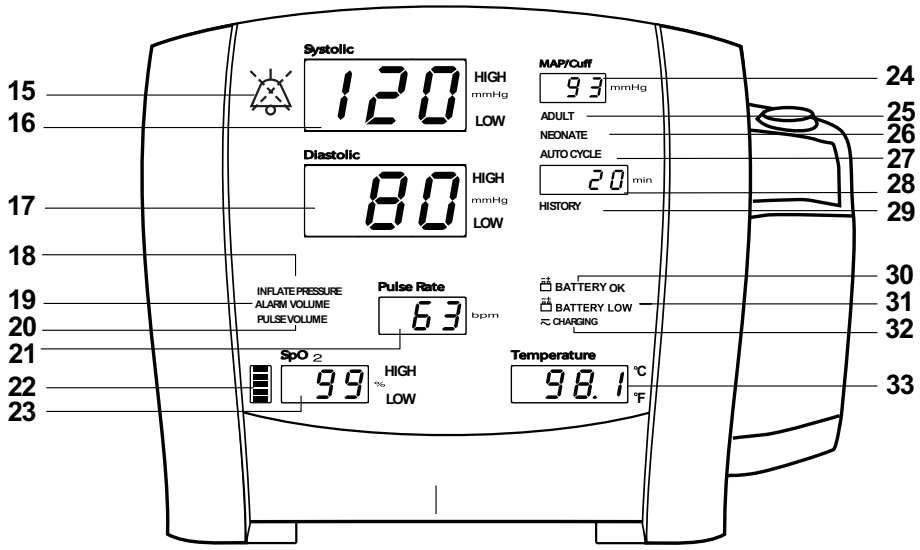


1. **Silence** button: mutes audible alarms. Any other active alarm that can be acknowledged is also cleared and the alarm condition is reset whenever this key is pressed. When pressed, the alarm silence indicator (bell) lights solid red to indicate that audible alarms have been silenced for 2 minutes. Alarm silence can be cancelled by pressing the **Silence** button again.
2. **Alarms** button: used to view or adjust parameter alarm limit settings.
3. **+/-** buttons (Plus/Minus): used when you are in the following modes: limit, menu, cycle, and history.
   - When you are in limit or menu setting, pressing the **+/-** button increases and decreases an adjustable setting.
   - When you are in cycle or history mode, pressing the **+/-** buttons displays the next or previous cycle selection or entry in the history list, respectively.
   - When you reach the beginning or ending of a list, a negative key-click sounds.
4. **Menu** button: accesses menu settings that can be adjusted: ***INFLATE PRESSURE*** (***ADULT*** and ***NEONATE***), ***ALARM VOLUME***, and ***PULSE VOLUME***. (Refer to "Operating modes" on page 3-5 for a description of clinical mode.)

   NOTE
   ADULT indicator encompasses both adult and pediatric patients.
5. SpO_2 sensor connector: attach SpO_2 cables here.
6. NIBP connector: attach NIBP cuff hoses here.
7. **Inflate/Stop** button: starts a manual NIBP determination or stop any NIBP determination.
8. Temperature probe holster: stores Alaris temperature probe.

9. **Cycle** button: used to select NIBP mode of manual, auto cycle, or Stat mode.
10. Temperature probe cover storage: stores Alaris probe covers.
11. **History** button: activates the history mode to view stored patient data. The most recent entries are displayed first. Press and hold the button for 2 seconds to clear all entries stored.
12. **Print** button: prints currently displayed values or all stored entries when in history mode.
13. **On/Off** button: controls on/off state of monitor; push for power on and push again for power off.
14. Alaris temperature probe connector: attach temperature probe cable here. (The Exergen scanner connects to the host communication port at the back of the system. Refer to "Rear panel" on page 2-6).

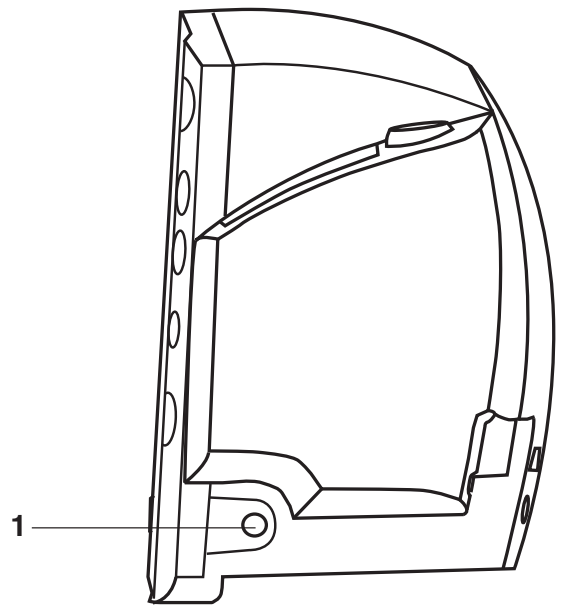
Front panel indicators



15. **Alarm** silence indicator:
    - Solid red: Indicates that an alarm silence is active and the audible alarm tones are silenced for 2 minutes.
    - Blinking red (Legacy alarm mode only): Indicates that an alarm silence is not active and at least one alarm condition is present.
16. **Systolic** window: indicates measured systolic NIBP in mmHg.
17. **Diastolic** window: indicates measured diastolic NIBP in mmHg.
18. ***INFLATE PRESSURE*** indicator: flashes to indicate you are making a change to the inflation pressure. Adjustable for adult/ped and neonate patients.
19. ***ALARM VOLUME*** indicator: flashes to indicate you are making a change to the alarm volume.
20. ***PULSE VOLUME*** indicator: flashes to indicate you are making a change to the pulse volume.

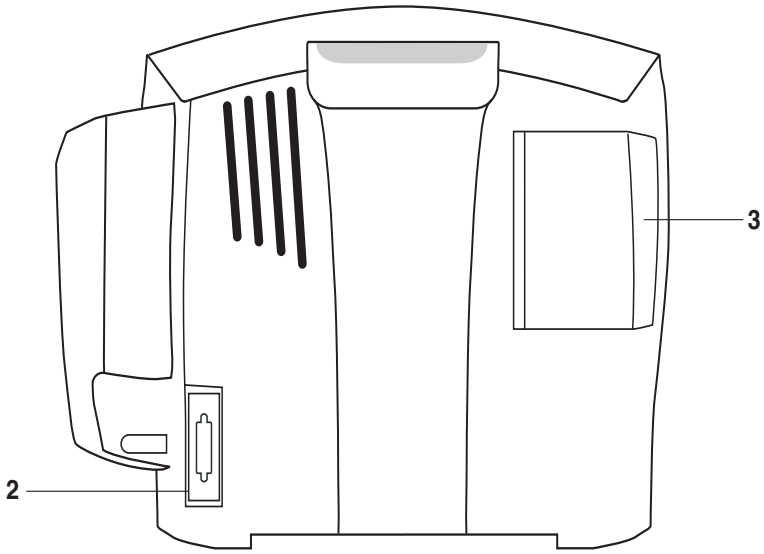
21. **Pulse Rate** window: shows pulse rate in beats per minute.
22. SpO_2 pulse indicator: flashing red LED bar indicates that pulses are being derived from SpO_2 signals.
23. **SpO_2** window: indicates oxygen saturation in %.
24. **MAP/Cuff** window: indicates measured mean arterial pressure (MAP) in mmHg and shows cuff pressure during NIBP determination.
25. ***ADULT*** indicator: lights to indicate you are making a change to adult/ped NIBP limits or inflation pressure settings.
26. ***NEONATE*** indicator: lights to indicate you are making a change to neonate NIBP limits or inflation pressure settings.
27. ***AUTO CYCLE*** indicator: lights green to indicate auto mode is the chosen NIBP mode; flashes to indicate you are making a change to the auto mode.
28. **Min** window: displays the NIBP mode if manual or ***Stat*** as well as the cycle time when taking auto NIBP determinations.
29. ***HISTORY*** indicator: flashes to indicate you are in history mode.
30. ***BATTERY OK*** indicator: lights green to indicate the monitor is operating on battery power and that the battery is sufficiently charged.
31. ***BATTERY LOW*** indicator: lights amber to indicate low charge for the battery (less than 45 minutes when solid; 5 minutes or less when flashing).
32. ***CHARGING*** indicator: lights green to indicate presence of external power source and battery charging.
33. **Temperature** window: indicates measured temperature.

Right-side panel



Rear panel

1. External DC power socket: used with approved GE AC-DC power converter *only*. Refer to "Parts lists and drawings" on page 6-1 for the part number of the approved power supply.



2. Host communication port (15 pin D-type) for use only with equipment conforming to IEC 60601-1 or configured to comply with IEC 60601-1-1. The Exergen scanner connects to this port.

   NOTES

   - For connection details, see "Host communication connector" on page 3-15.
   - Attach one accessory to this port.

3. Printer door.

Host communication port

The host communication port is used to interface the CARESCAPE V100 vital signs monitor with other electronic devices (a central nurse's station or remote alarm device), or with the Exergen scanner. For further information, reference the Host Communication manual.

CARESCAPE V100 vital signs monitor connectivity options

The following connectivity options are available for use with the CARESCAPE V100 vital signs monitor and can be purchased from GE:

- DINALINK™ adapter: The DINALINK adapter is an accessory that connects the CARESCAPE V100 vital signs monitor to the ApexPro telemetry system, enabling vital signs to be transmitted to and displayed on a Central Station.
- Direct Connection: Isolated adapter cables are used to connect the CARESCAPE V100 vital signs monitor to general purpose devices, such as a PC.
- DINAWIN Application Programming Interface (API) software: The DINAWIN API is a software library that can be installed on a PC to facilitate the

development of applications exchanging data with the CARESCAPE V100 vital signs monitor.

- An interface to the Pyxis Nursing Data Collection mobile clinical data collection application from CareFusion Corporation.
- Remote Alarm Cable: This cable connects the CARESCAPE V100 vital signs monitor to the hospital's remote alarm "Nurse Call" system to provide remote alarming.

For more information, see "Host communication connector" on page 3-15.

GE frequently updates its connectivity accessory offerings. Please contact your GE sales representative for the latest information on connectivity solutions for your monitor.

Product compliance

The CARESCAPE V100 vital signs monitor is classified in the following categories for compliance with IEC 60601-1:

- Internally powered or Class II when powered from external supply.
- Transportable.
- For continuous operation.
- Not suitable for use in the presence of flammable anesthetics.
- Not for use in the presence of an oxygen-enriched atmosphere (oxygen tent).
- Type BF defibrillation-proof applied parts.
- IPX1, degree of protection against ingress of water.
- Sterilization/Disinfection, see "Cleaning" on page 4-3.
- Software is developed in accordance with IEC 60601-1-4.
- The monitor complies to IEC 60601-2-49.
- The alarm system is developed in accordance with IEC 60601-1-8.
- This equipment is suitable for connection to public mains via power adapters as defined in CISPR 11.
- The SpO_2 parameter complies to ISO 9919.
- The NIBP parameter complies to IEC 60601-2-30, EN 1060-1, EN 1060-3, and ANSI/AAMI SP10.
- The Temperature parameter complies to ASTM E-1112-00.
- Defibrillation protected. When used with the recommended accessories, the monitor is protected against the effects of defibrillator discharge. If monitoring is disrupted by the defibrillation, the monitor will recover.
- This product conforms with the essential requirements of the Medical Device Directive 93/42/EEC. Accessories without the CE mark are not guaranteed to meet the Essential Requirements of the Medical Device Directive.

Overall principles of operation

This section provides overall theory of operation and functional description of the monitor.

The monitor is a portable unit that receives power from an internal rechargeable lead-acid main battery.

When the **On/Off** button is pressed, the Main Board is brought out of a sleep mode and turns on the power regulators. The power regulators provide conditioned power from the main battery. The external DC source is used only to charge the main battery. Once the monitor is energized, a self-test is performed. The self-test automatically tests the main functions of the monitor. Failure of the self-test will set the monitor into a fail-safe mode with an audio alarm.

Under normal operating conditions, the monitor is ready to record the patient vital signs using three external attachments: the temperature probe, SpO_2 sensor, and cuff. Interface with a central station or other device is accomplished through the host communication port on the back of the monitor.

NOTES

- Prior to each use, inspect the power supply cord to ensure proper connection and condition.
- Be sure to unplug the monitor before transport.

SpO_2

The SpO_2 probe has a built-in sensor. When the SpO_2 sensor is attached to the SpO_2 connector and patient, the probe senses both heart rate and oxygen saturation. The analog signals are routed to the SpO_2 Printed Wiring Assemblies (PWA) for Ohmeda, Nellcor, or Masimo. The analog signals are analyzed on the SpO_2 PWA. The results are digitized and sent to the Main Board via opto couplers. The couplers provide patient isolation as well as serial data interface. The Main Board temporarily stores the data and routes it to the UI Board for display and/or printer.

A reset signal to the SpO_2 PWA is also provided so that power up sequencing is correct. If the SpO_2 circuit quits communicating to the Main Board, the Main Board will attempt to reset the SpO_2 PWA.

Cuff blood pressure (NIBP) and pulse

The NIBP parameter in the monitor is available with three types of DINAMAP NIBP technologies: two calibrated to intra-arterial pressure (Classic and SuperSTAT) and one calibrated to the auscultatory method (Auscultatory). Specific technologies are available in select markets. All user interface options, instructions for use, and alarms will be the same for all technologies. The NIBP parameter is included in all models. Blood pressure is monitored noninvasively in the monitor by oscillometric method.

NOTE

For neonatal populations, the reference is always the intra-arterial pressure monitoring method.

When the cuff and hose are attached to the monitor and a Non-Invasive Blood Pressure (NIBP) determination is initiated, the pump inflates the cuff. Pressure transducers PT1 and PT2 monitor pressure information. The pneumatic manifold

has one valve, which is used to deflate the cuff. Valve control is through the Main Board. When the cuff pressure data acquisition for the determination is complete, the processor on the Main Board calculates the systolic NIBP, the diastolic NIBP, the Mean Arterial Pressure (MAP), and the pulse rate. The results are then displayed on the UI Board and sent to the printer (if the user presses the **Print** button).

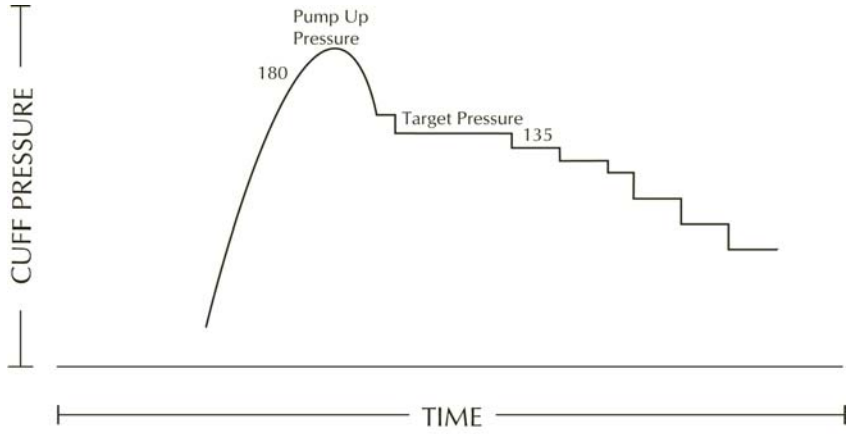
The Pneumatics are controlled by the NIBP processor. The NIBP processor monitors pressure information from PT2. If an over-inflation condition occurs, the OVERPRESSURE signal is routed to the Pneumatics to release the air pressure. The Main Board also generates an alarm condition with the speaker sounding and error code message on the UI Board.

DINAMAP SuperSTAT algorithm

The oscillometric method of determining NIBP is accomplished by a sensitive transducer which measures cuff pressure and pressure oscillations within the cuff. For the first determination taken on a patient, the algorithm stores the pattern of the patient's oscillation size as a function of the pressure steps. For subsequent manual, auto, or Stat determinations taken within 2 minutes of a previous determination of the same patient, as few as four pressure steps may be necessary to complete the determination process. In auto mode the data is stored for up to 16 minutes. When employing fewer pressure steps, the system uses the stored information from the previous blood pressure determination to decide the best pressure steps to take. The algorithm measures the consistency of pulse size to tell if the oscillations taken at a step are good and if more steps are needed.

The first determination settles at an initial target pressure of 135 mmHg (adult mode) and 100 mmHg (neonate mode), depending on initial target pressure preset. To allow for rapid settling of cuff pressure, the monitor will momentarily inflate to a higher pressure then immediately deflate to the target pressure. After inflating the cuff, the NIBP parameter begins to deflate. The oscillations versus cuff pressure are measured to determine the mean pressure and calculate the systolic and diastolic pressures.

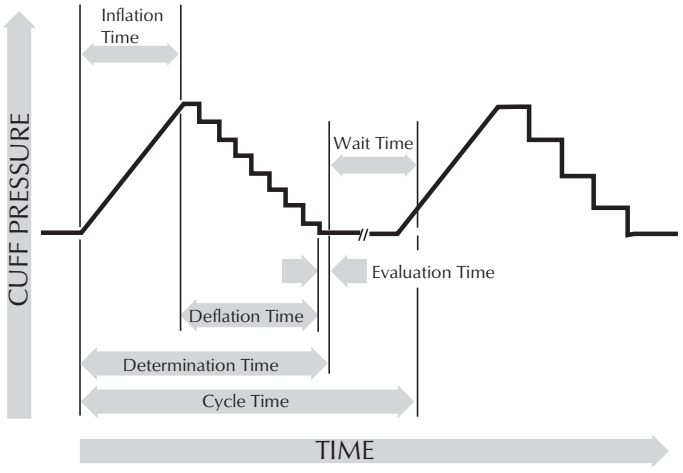
During an NIBP determination, the parameter deflates the cuff one step each time it detects two pulsations of relatively equal amplitude. The time between deflation steps depends on the frequency of these matched pulses (pulse rate of the patient). However, if the monitor is unable to find any pulse within several seconds, it will deflate to the next step. The process of finding two matched pulses at each step provides artifact rejection due to patient movement and greatly enhances the accuracy of the monitor. The figure shows a full determination sequence for an adult patient. In ***Stat*** mode, some steps may require only one pulse.



Full NIBP determination sequence for adult (specific pressure values are examples only)

At each step the microprocessor stores cuff pressure, the matched pulse amplitude, and the time between successive pulses. The stepped deflation and matched pulse detection continues until diastolic pressure is determined or total cuff pressure falls below 8 mmHg. The parameter then deflates the cuff (to zero detected pressure), analyzes the stored data, and updates the screen.

The operating cycle is composed of four parts: inflation time, deflation time, evaluation time, and wait time. Wait time, which varies from mode to mode, is affected by the cycle time (auto mode) or operator intervention (manual mode). The figure shows the basic operating cycle for an NIBP determination.



SuperSTAT NIBP - auto mode

Systolic search

If systolic pressure is not found, the SuperSTAT algorithm can search at cuff pressures higher than the initial target pressure. The algorithm will inflate above the initial target pressure to obtain more data in the systolic region. The pressure is limited to the maximum allowed for the selected patient type.

The SuperSTAT algorithm evaluates the data obtained during the determination, and the prior determination if it is available, to determine if additional data is needed to complete the determination. It can then selectively pump to a single cuff pressure to obtain the data it needs and then return to the existing deflation sequence. This search process makes SuperSTAT more efficient.

Accuracy of the DINAMAP NIBP measurements was validated against the intra-arterial method. Do not use the auscultatory method to verify the accuracy of the SuperSTAT NIBP parameter. The auscultatory method (using the cuff and stethoscope) determines the systolic and diastolic pressures from sounds that occur during cuff deflation. Mean arterial pressure cannot be determined by the auscultation method. The oscillometric method used with all DINAMAP technologies determines systolic, mean and diastolic pressures from the oscillation pattern that occurs in the cuff during deflation.

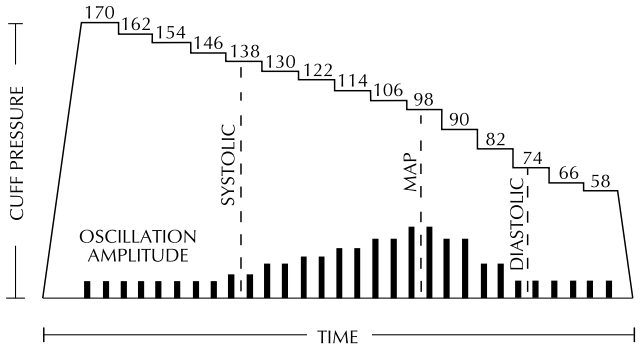
NOTE

Arrhythmias will increase the time required by the NIBP parameter to determine a blood pressure.

DINAMAP Classic and auscultatory reference algorithm

The oscillometric method of determining NIBP is accomplished by a sensitive transducer, which measures cuff pressure and minute pressure oscillations within the cuff. The first determination sequence initially pumps up to a cuff pressure of about 160 mmHg for adult/pediatric patients or 110 mmHg for neonates depending on initial target pressure preset. After inflating the cuff, the monitor begins to deflate it and measures systolic pressure, mean arterial pressure, and diastolic pressure. When the diastolic pressure has been determined, the monitor finishes deflating the cuff and updates the screen.

The monitor deflates the cuff one step each time it detects two pulsations of relatively equal amplitude. The time between deflation steps depends on the frequency of these matched pulses (pulse rate of the patient). However, if the monitor is unable to find any pulse within several seconds, it will deflate to the next step. The process of finding two matched pulses at each step provides artifact rejection due to patient movement and greatly enhances the accuracy of the monitor. The figure shows the NIBP determination sequence.

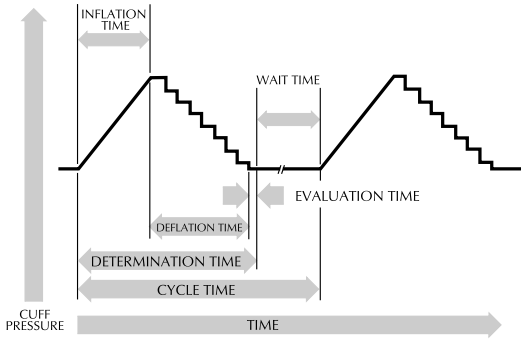


NIBP determination sequence (specific pressure values are examples only)

At each step the microprocessor stores cuff pressure, the matched pulse amplitude, and the time between successive pulses. The stepped deflation and matched pulse detection continues until diastolic pressure is determined or total

cuff pressure falls below 7 mmHg. The monitor then deflates the cuff (to zero detected pressure), analyzes the stored data, and updates the screen.

The operating cycle is composed of four parts: inflation time, deflation time, evaluation time, and wait time. Wait time, which varies from mode to mode, is affected by the cycle time (auto mode) or operator intervention (manual mode). The figure shows the basic operating cycle.



NIBP operating cycle

Systolic search

If systolic pressure is not found, the NIBP parameter can search at cuff pressures higher than the initial target pressure. The parameter will inflate the cuff above the initial target pressure to get more data in the systolic region. The pressure is limited to the maximum allowed for the selected patient type.

In any operating mode, if a patient's systolic pressure exceeds the inflation pressure of the monitor, the monitor will begin normal deflation sequence, detect the absence of a systolic value, stop deflation, reinflate to a higher (than initial) inflation pressure, and resume normal deflation sequence.

In manual mode, if a previous valid systolic pressure is displayed and less than 2 minutes old, and the new systolic pressure oscillations are compared with the previous valid determination and the monitor "thinks" that the systolic was not obtained, the monitor will inflate the cuff to a pressure above the immediately preceding inflation.

Reference used to determine NIBP accuracy

To establish accuracy of an NIBP device, manufacturers have used several different types of references. The reference blood pressures may be obtained by invasive pressure monitoring at the central aortic region or at the radial sites. The reference blood pressures may also be obtained by noninvasive methods like auscultatory method (using cuff and stethoscope).

NOTE

For neonatal mode, the reference is always the intra-arterial pressure monitoring method.

Monitors with intra-arterial reference (DINAMAP SuperSTAT and classic technology)

For these monitors, the NIBP is referenced to the invasive blood pressure obtained at the central aortic region.

Monitors with auscultatory reference (DINAMAP auscultatory reference technology)

In these monitors, the reference blood pressure is the auscultatory method for adult and pediatric populations. For neonatal populations, the usual reference is the invasive blood pressure obtained from the umbilical artery.

NOTE

For neonatal determinations the SuperSTAT algorithm is always used.

Temperature

The monitor uses the following technologies to measure patient temperature: Alaris Turbo Temp, Alaris Tri-Site, or Exergen.

Alaris temperatures

The Alaris temperature probes contain a heating element that preheats the probe to reduce determination time. The heating function is controlled by the Main Board. The Alaris probes also contain a thermistor that indicates the temperature. When the probe is attached to the temperature connector and patient, the signal generated by a thermistor that senses temperature is routed to the Main Board. When the probe makes contact with the patient, the resistance of the thermistor is sensed by circuitry on the Main Board. The Main Board then processes the digital signal and displays the patient temperature on the UI Board and printer in Celsius or Fahrenheit.

When the monitor is powered on, the monitor automatically calibrates the temperature circuit to account for ambient room temperature. This is done by measuring a high precision resistor of known value, computing a calibration factor, and applying this factor to all subsequent measurements.

NOTE

If large changes occur in the ambient temperature, the temperature system can be recalibrated by cycling power using the **On/Off** button.

Furthermore, at one minute intervals, the monitor verifies the voltage supplied to the temperature circuit to ensure that readings calculated using that factor are accurate. If the voltage is found to be out of tolerance, the monitor issues an alarm.

Alaris Turbo Temp or Tri-Site temperature options

NOTE

Either the Turbo Temp or the Tri-Site temperature option can be enabled on the monitor at a time.

The Alaris temperature technology supports two temperature options: Turbo Temp or Tri-Site. The Turbo Temp and Tri-Site temperature options allow the clinician to take oral, rectal, or axillary temperature readings.

The Turbo Temp or Tri-Site temperature options support two different temperature measurement modes of operation: fast (predictive) or continuous (monitor).

- The Turbo Temp temperature option can take a fast (predictive) oral or rectal

temperature measurement, but not a fast (predictive) axillary temperature measurement.

- The Tri-Site temperature option can take a fast (predictive) oral, rectal, or axillary measurement.
- Both the Turbo Temp and Tri-Site temperature options can take a continuous (monitor) oral, rectal, or axillary measurement.

Exergen temperature

The Exergen Temporal*Scanner*™ Temporal Artery Thermometer uses ultrafast infrared scanning technology with arterial heat balance algorithms to quickly and non-invasively measure the patient's temperature. As the caregiver passes the scanner over the patient's skin, its infrared sensor samples at 1000 times per second the radiant heat emanating from the body, which reaches a maximum over the temporal artery. The scanner then derives the patient's body temperature from the peak infrared sensor readings and the local ambient temperature as measured by the scanner. A scan behind the ear is included in the use protocol to prevent errors due to perspiration.

Refer to the operator's manual for complete instructions for use. For more information on the theory of operation, scientific, educational and technical information, access the following website: www.TAThermometry.org.

Functional description

The following paragraphs provide the functional interface relationship. The monitor contains a number of electrical and electro-mechanical assemblies. These assemblies are:

- Main Board PWA
- User Interface (UI) Board PWA
- SpO_2 PWA (optional)
- Printer (optional)
- Pneumatic Valve/Manifold (PVM)
- Optical Switch (optional)

Main board PWA

The monitor's Main Board is based on the NXP LPC2366 integrated microprocessor. The microprocessor integrates Flash ROM, RAM, A/D converter with input multiplexer, SPI interface, and timers into one chip. This microprocessor is the primary processor for the monitor. It services and controls the Patient Parameter Interface (PPI) devices, printer, UI Board, Real Time Clock, audio circuit, and host communication. There are three TI MSP430 secondary processors that control Power, NIBP and Temperature. The Power Processor controls the watchdog, primary processor reset, and power supply control. The Power processor is powered at all times.

The NIBP processor controls pneumatic safety interlock, timing check, and NIBP control. The temperature processor controls the temperature parameter.

Independent software in the primary and secondary processor periodically communicates when the software systems are operating properly. When either system stops processing or detects an error, it stops communicating with the other. Either system, upon detecting a failure, can assert a safe state (herein called FAILSAFE) of the hardware.

Upon entering a FAILSAFE condition, the Main Board will perform the following tasks:

- Parameter monitoring disabled
- Alarm tone sounding from speaker
- Pneumatic FAILSAFE (deflate the cuff, pump off)
- Normal communications interface disabled
- Remote alarm is in alarm state
- Hard keys except **On/Off** key inactive

The **On/Off** key can reset the monitor and end the FAILSAFE condition. The FAILSAFE condition will terminate automatically after 5 minutes to preserve battery power.

All regulated DC power, isolated and non-isolated is generated on the Main Board from main battery supply. The external DC input is used to charge the main battery via charging circuitry on the Main Board.

User interface (UI) board PWA

The UI Board is used as a message center. It displays patient vital signs, alarms status, monitor set-up, limit violation, NIBP cycle and the time the data was received. The primary processor on the Main Board controls the UI Board. When the primary processor reads the parameter signals, it decodes the signals and routes the display information to the UI Board.

The UI assembly also provides hardkey switches for the monitor's Main Board. The primary processor asserts a ***HIGH*** on the 16 outputs of the 1-of-16 decoder/demultiplexer one at a time and then reads at the signal on SW_MUX. A ***LOW*** on SW_MUX indicates that the switch is asserted.

SpO_2 PWA

The monitor can be configured for use with either an Ohmeda, Nellcor, or Masimo SpO_2 PWA. The SpO_2 PWA provides continuous readings of oxygen saturation and pulse rate. Additional circuitry on the Main Board provides power, data communications, and isolation between SpO_2 PWA and primary processor.

Patient data received from the finger sensor is filtered, amplified, and analyzed on the SpO_2 PWA. The information is sent to the Main Board via the optically coupled electrically isolated serial connection. The primary processor receives the data and routes it to the UI board for display. The data is also sent to the printer if specified.

Printer

The printer receives power from the Main Board and communicates with the primary processor. Printer presence and print head temperature is indicated by PR_TH signal to the primary processor. When a print command is sent to the printer from the primary processor, the following will occur:

- PR_CLK signal - transfer the data into print head
- PR_DI signal - serial dot to be printed
- PR_LAT signal - latch the data stream into the head
- PR_ST1-6 - cause the head to print various sections
- PR_M1-4 signals - control power sequentially to the two stepper motor windings

Together these signals (CONTROL DATA) cause the printer to print a graphic hardcopy of the patient vital sign values and trend data. It also causes the printer to print a hardcopy of error logging and service record data.

The printer has a built-in sensor to monitor the printer paper presence. When the printer is out of paper, it sends a PAPER OUT signal to the primary processor.

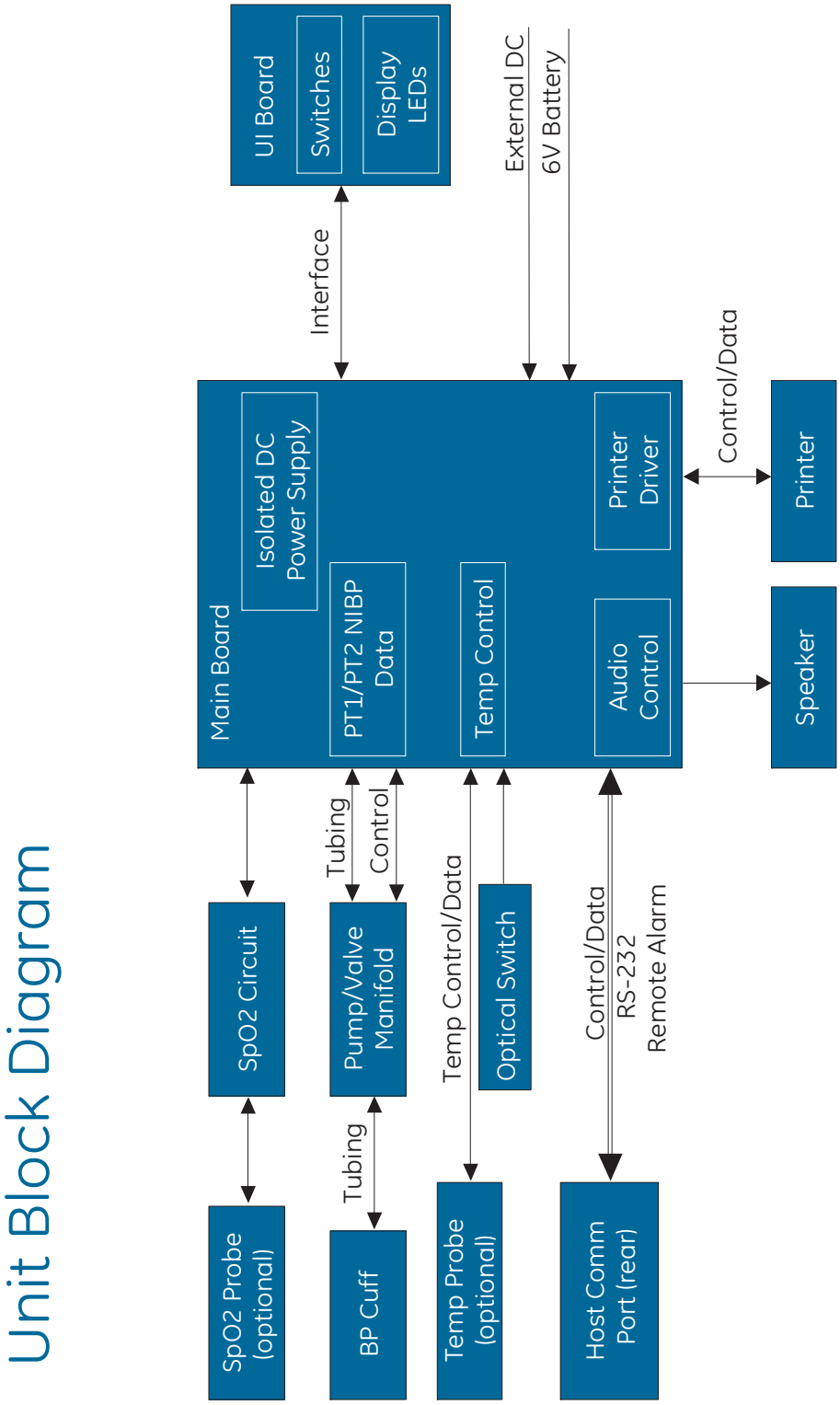
Pneumatics

The pneumatics consists of a pump, a deflate valve, and a dump valve. The pneumatics inflates/deflates the cuff during NIBP determinations. During normal operation the pneumatics are controlled by the primary processor. If a FAILSAFE mode or overpressure condition occurs, the NIBP processor provides the appropriate control signals to ensure a safe condition, where the cuff vents to ambient atmosphere pressure.

Optical switch

The optical switch indicates whether the Alaris temperature probe is inserted in the probe holder or not. The Main Board powers the switch.

Unit Block Diagram



For your notes

3 Installation

Unpacking and preparation for installation

1. Unpack and identify the contents of all shipping materials.
2. Remove the monitor.
3. Unpack the AC cord.
4. Plug the AC cord into the AC Mains input on the external power supply, and plug the supply DC output into the side of the monitor.

   NOTE

   Use only the original cord, a power cord recommended by GE, or a regulatory-approved cord for the country of use.

5. Plug the AC cord into a Hospital Grounded AC receptacle. The word ***CHARGING*** will illuminate green on the front of the monitor indicating that an AC source is available.

Prior to usage it is necessary to charge the monitor for 8 hours. This charge calibrates the main battery charging circuitry with the charge status of the battery.

Powering the monitor

Power sources

The monitor is designed to operate from an internal lead-acid main battery.

NOTE

The monitor is not designed to operate without a functional internal main battery.

Main battery charging

Prior to each use, inspect the power supply cord to ensure proper connection and condition.

NOTE

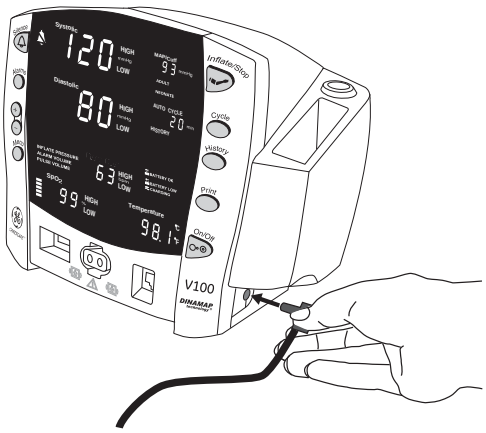
Repeated failure to fully recharge the battery will, over time, lead to a significant reduction in the battery's capacity.

With external DC power connected, the green ***CHARGING*** indicator will light to indicate that the main battery is charging. This indicator remains active whether the unit is on or off. An audible "two beep" sounds whenever the DC charger is connected/disconnected.

When connected to the monitor, the battery charger sounds a single low-pitched tone followed by a single higher-pitched tone. Upon disconnection from the monitor, the battery charger sounds a single high-pitched tone followed by a single lower-pitched tone.

Battery charging will take place as long as the monitor remains connected to an external DC power source.

- Charge battery pack for 8 hours before first use or after prolonged periods of storage.
- If the monitor is idle for extended periods, it should be fully charged at least once a month to ensure optimum performance. If the monitor is to be stored for longer than one month, first charge the battery and then remove it and store it separately from the monitor.
- The battery pack should be charged before use, because a charged battery loses charge when left in storage. Sealed lead-acid batteries can discharge to less than 80% of charge within 60 days of storage. Charging is done automatically by the monitor when the external DC power is connected.
- The battery pack should be charged at room temperature: 16°C to 30°C (59°F to 86°F).
- You can charge or top-off the battery pack at any time. You should not wait until battery is fully discharged.
- To prolong the life of the battery, keep the monitor connected to a DC power supply whenever possible. Do not allow the battery to become completely discharged.
- A fully charged battery will power the monitor for approximately 5-11 hours, depending upon configuration and usage.



- To ensure full charge cycles, replace only with the specified battery.

BATTERY OK

When the monitor is operating on main battery power and the ***BATTERY LOW*** alarm is not active, the ***BATTERY OK*** indicator is backlit green.

Battery alarms

When about 45 minutes of main battery charge remains:

The low-priority ***BATTERY LOW*** alarm is issued.

- The ***BATTERY LOW*** indicator illuminates.
- This alarm can be acknowledged and cleared by pressing the **Silence** button.
- The ***BATTERY LOW*** alarm will re-alarm every 10 minutes after it has been acknowledged.
- If the alarm is not acknowledged, the alarm is re-issued every 8 seconds.
- The monitor continues to operate normally.

When about 5 minutes of main battery charge remains:

The low-priority ***BATTERY LOW*** alarm escalates to a high-priority ***BATTERY LOW*** alarm.

- The ***BATTERY LOW*** indicator flashes.
- Any NIBP determination in progress at the time of the alarm escalation is allowed to finish.
- Any ***Stat*** mode cycle that was initiated before the alarm escalation is allowed to finish.
- The user is not able to initiate:
  - any new NIBP determinations of any type
  - any printouts

NOTE

At this time, it is highly recommended to plug the monitor into external DC power.

When 5 minutes of main battery charge expires:

After 5 minutes of high-priority ***BATTERY LOW*** alarm, the monitor enters a battery low shutdown.

- No error code is displayed.
- The ***BATTERY LOW*** indicator flashes.
- The monitor alarms for 2.5 minutes, then shuts down completely.

  NOTE

  You must plug the monitor into DC power before resuming monitoring.

After plugging the monitor into DC power:

- The ***BATTERY LOW*** indicator (when the monitor is on) and ***CHARGING*** indicator illuminate.
- The ***BATTERY LOW*** indicator turns off when the battery level reaches a sufficient charge level to operate without the ***BATTERY LOW*** alarm active.

E13 BATTERY LOW

At any time while the high-priority ***BATTERY LOW*** alarm is active, certain actions can trigger the '***E13***' ***BATTERY LOW*** alarm: any attempt to start an NIBP determination or a printout. This alarm is giving you additional warning that the battery charge is critically low.

NOTE

At this time, it is highly recommended to plug the monitor into external DC power.

- The '***E13***' error code appears in the **min** window.
- The ***BATTERY LOW*** indicator flashes.
- This alarm can be acknowledged by pressing the **Silence** button.
- The user is not able to initiate:
  - any new NIBP determinations of any type
  - any printouts

Configuring the monitor

Operating modes

The monitor can operate in one of four modes: clinical, configuration, advanced configuration, and service.

Clinical mode

Clinical mode is the monitor's normal operating mode. While this mode is active, alarm limits and a few other commonly used settings are adjustable. All parameters are available for monitoring in this mode.

Configuration mode

Configuration and advanced configuration modes display the software revision and allow you to configure defaults for some settings that are available in clinical mode, as well as some less commonly used settings that are only adjustable in these modes. A fatal error history is also available in the advanced configuration mode. No parameters are operable in these modes, therefore, patient monitoring is suspended.

Configuration mode settings

Monitor settings such as ***HIGH***/***LOW*** alarm settings changed in the Clinical Mode will not be retained after the monitor is powered off. To retain alarm and parameter settings, the changes must be done in the configuration mode. Date/Time settings are also entered in the configuration mode.

To enter the configuration mode: with the monitor off, press and hold the **Menu** button at the same time as pressing and holding the **On/Off** button for 3 seconds. The monitor enters the configuration mode.

For a few seconds immediately after power up in this mode, the **Systolic** and **Diastolic** windows display the major and minor version codes. The version codes are numbers that represent the letters of the English alphabet, which are designated to the currently loaded version of the monitor firmware (e.g., 1 indicates A, 2 indicates B, etc.).

At the same time, the NIBP Algorithm selected in the monitor is displayed in the **min** (minutes display) window as follows:

- ***AUSC*** if the monitor is configured with auscultatory NIBP Algorithm
- ***STAT*** if the monitor is configured with DINAMAP SuperSTAT Algorithm
- ***CLAS*** if the monitor is configured with DINAMAP Classic Algorithm

Also, the Temperature probe selected in the monitor is displayed in the **Temperature** window as follows:

- ***trb0*** if the monitor is configured for Alaris Turbo Temp
- ***trI*** if the monitor is configured for Alaris Tri-Site
- ***tat*** if the monitor is configured for Exergen

Display	Window
Major software revision	**Systolic**
Minor software revision	**Diastolic**
Type of NIBP technology	**min**
Temperature type technology	**Temperature**

These displays appear only during the first part of the power up sequence and are not selectable and cannot be changed. After a moment, this version information is cleared, and the monitor displays the first page of configuration mode which simply displays CFG in the **Systolic** window.

Pressing the **Menu** button cycles through all the configuration option pages. After all options pages have been displayed, the display returns to the first configuration mode page (displaying CFG). You can use the **+** and **-** buttons to make changes to settings. After making changes, simply cycle the power to return to normal operation (clinical) mode. Changes are automatically retained.

NOTES

- If a parameter is not enabled, its options are not displayed.
- Menu selections for SpO_2 settings are different depending upon the SpO_2 technology your monitor contains.

The Menu selections appear in the following order. Refer to the manual section for settings options.

Setting	Window	LED display	Pulse Rate window display	Comment
Inflate pressure (adult/ped)	**Systolic**	XXX (numeric)	XXX (numeric)	***ADULT*** indicator illuminated, ***INFLATE PRESSURE*** indicator flashing
Inflate pressure (neonate)	**Systolic**	XXX (numeric)	XXX (numeric)	***NEONATE*** indicator illuminated, ***INFLATE PRESSURE*** indicator flashing
Line frequency mode (Ohmeda TruSignal only)	**SpO_2**	***50*** or ***60***	LF	AC line frequency
SpO_2 mode (Nellcor only)	**SpO_2**	***1*** or ***2***	MOd	User selects the averaging technique* 1=Normal Response 2= Fast Response
SpO_2 sat (Nellcor only)	**SpO_2**	***0***, ***10***, ***25***, ***50***, ***100***	SAt	User selects the SMART Sat tolerance level *
SpO_2 mode (Masimo only)	**SpO_2**	***4***, ***6***, ***8***, ***10***, ***12***, ***14***, ***16***	MOd	User selects the number of seconds over which data is averaged 4 to 16*

Setting	Window	LED display	Pulse Rate window display	Comment
SpO_2 sat (Masimo only)	**SpO_2**	***0*** or ***1***	SAt	Fast Sat Mode 0=Off 1=On*
SpO_2 sensitivity (Masimo only)	**SpO_2**	***1***, ***2***, ***3***	SEn	1= Low Perfusion-Maximized, 2= Low Perfusion-Default, 3= for engaging Adaptive Probe Off Technology algorithm*
Temperature units	**Temperature**	blank	Unt	***C*** or ***F*** indicator illuminated (Alaris only)
Temperature display time	**Temperature**	***2*** or ***5***	tdt	User selects number of minutes temperature values are displayed.
Year	**Systolic**	XXX (numeric)	Yr	use **+** and **-** keys to change
Month	**MAP/Cuff**	XXX (numeric)	MtH	use **+** and **-** keys to change
Day	**Diastolic**	XXX (numeric)	dAY	use **+** and **-** keys to change
Hour	**min**	XXX (numeric)	Hr	use **+** and **-** keys to change
Minute	**min**	XXX (numeric)	Min	use **+** and **-** keys to change
Mode (when main screen is active)	**Systolic**	blank	CFG	indicates configuration mode
NOTE: Refer to the "*SpO_2*" section of operator's manual for detailed descriptions of the different user selectable SpO_2 settings.				

Setting the date and time – To set the date and time on the monitor, you must access the configuration mode. Press **Menu** to skip the default settings that do not require changes. Refer to the table above.

NOTE

While in configuration mode, all entries stored in the clinical history are erased when the time and/or date is changed.

Procedures

1. Press the **Menu** button to move from one setting to another. Use the **+/-** buttons to increment or decrement the setting.

   NOTE

   For the date and time to be saved, you must advance the menu through the minute setting.

2. To exit the configuration mode, press the **On/Off** button.
3. To continue with other changes, press the **Menu** button. CFG will appear in the **Systolic** window. To change parameter settings, press the **Menu** button

and select the parameter function. To change alarm settings, press the **Alarms** button.

Inflation pressure default setting

Procedures

1. Enter the configuration mode: with the monitor off, press and hold the **Menu** button at the same time as pressing and holding the **On/Off** button for 3 seconds.
2. Use the **+/-** buttons to increment or decrement the inflate pressure default setting.
3. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press **Menu**.

Vital sign alarm default settings

Procedures

1. Enter the configuration mode: with the monitor off, press and hold the **Menu** button at the same time as pressing and holding the **On/Off** button for 3 seconds. After the unit enters the configuration mode, press **Alarms**. At any point in the configuration mode menu, Alarms default can be selected.
2. To set or change the default setting, press the **Alarms** button to select alarm setting. Use the **+/-** buttons to increment or decrement the individual settings.

   NOTE

   For the Alarms default setting to be saved, you must advance the menu through the SpO_2 settings.

3. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press **Menu**.

Reverting to the factory default vital sign alarm limits

WARNING

The Line Frequency mode (for Datex-Ohmeda oximetry) must be set according to each country's electrical power utilities implementation; and it must be checked and reset any time the monitor is set to or reverts to factory default settings.

To revert to the factory default vital sign alarm limit settings, the monitor must be disconnected from the DC power supply and from the monitor battery. Refer to "Replacing the main battery on the monitor" on page 4-8 for DC power supply and battery disconnection/reconnection instructions.

When reverting to factory default settings, the user settings (including alarm limits and inflation pressure), date/time, and the Ohmeda TruSignal SpO_2 Line Frequency mode (***LF***) will go back to default values. Refer to "Configuration mode settings" on page 3-5 to configure the factory default user settings.

NOTE

For monitors configured for Ohmeda TruSignal SpO_2 only, verify that the setting for Line Frequency mode (***LF***) is correct for your country. Refer to "SpO2 configuration settings" on page 3-9.

SpO_2 configuration settings

Procedure for units with Ohmeda TruSignal technology

1. With the monitor off, press and hold the **Menu** button at the same time as pressing the **On/Off** button until the display test completes.
2. Press the **Menu** button until ***LF*** appears in the **Pulse Rate** window.
3. Use the **+/-** buttons to select the option.
4. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press the **Menu** button.

WARNING

The Line Frequency (LF) mode must be set according to each country's electrical power utilities implementation. The LF mode must be checked and reset any time the monitor is set to or reverts to factory default settings.

If the LF mode is set incorrectly, the susceptibility to ambient light is increased and low perfusion performance may be affected, resulting in potentially inaccurate readings.

Procedure for units with Nellcor technology

1. With the monitor off, press and hold the **Menu** button at the same time as pressing the **On/Off** button until the display test completes.
2. Press the **Menu** button until ***n0d*** (response mode) appears in the **Pulse Rate** window.
3. Use the **+/-** buttons to select the option.
4. Press the **Menu** button once. ***SAt*** (*SatSeconds*) appears in the **Pulse Rate** window.
5. Use the **+/-** buttons to select the option.
6. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press the **Menu** button.

Procedure for units with Masimo technology

1. With the monitor off, press and hold the **Menu** button at the same time as pressing the **On/Off** button until the display test completes.
2. Press the **Menu** button until ***n0d*** (averaging time) appears in the **Pulse Rate** window.
3. Use the **+/-** buttons to select the option.
4. Press the **Menu** button once. ***SAt*** (FastSAT) appears in the **Pulse Rate** window.
5. Use the **+/-** buttons to select the option.

6. Press the **Menu** button once. ***SEn*** (sensitivity mode) appears in the **Pulse Rate** window.
7. Use the **+/-**buttons to select the option.
8. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press the **Menu** button.

Temperature unit of measurement configuration settings

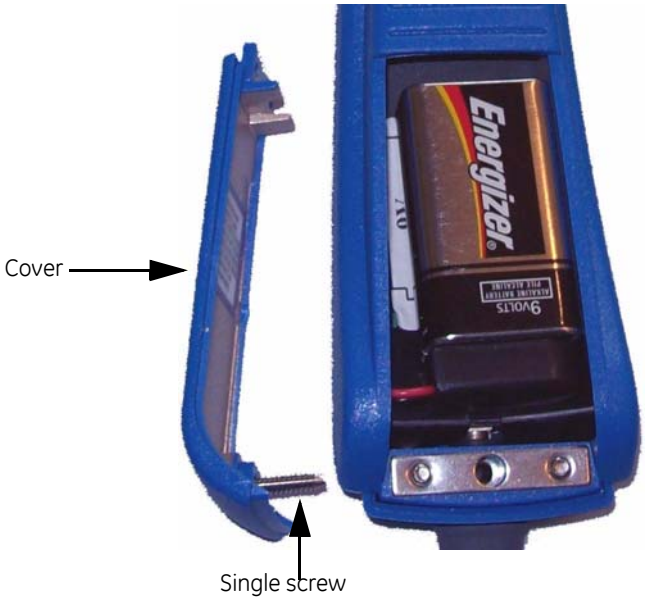
Procedure for units with Alaris probes

1. With the monitor off, press and hold the **Menu** button at the same time as pressing the **On/Off** button until the display test completes.
2. Press the **Menu** button until ***Unt*** (unit of measurement) appears in the **Pulse Rate** window.
3. Use the **+/-** buttons to select the option.
4. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press the **Menu** button.

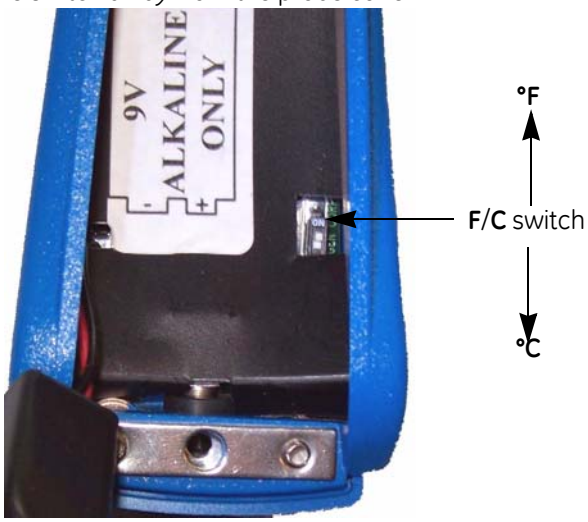
Procedure for units with Exergen scanner

The Exergen scanner comes preset with the requested unit of temperature measurement, but can be changed. To change the scanner's unit of measurement (***°C*** or ***°F***):

1. Unplug the scanner from the monitor's host communication port.
2. On the back of the scanner, loosen the single screw at the bottom and remove the cover.



3. To set the unit of measurement to:
   - ***°F*** — move the switch up *toward* the probe cone
   - ***°C*** — move the switch *away* from the probe cone



4. Replace the cover, and tighten the screw.

Temperature display time configuration settings

User selects number of minutes temperature values are displayed.

NOTE

This procedure applies to both the Alaris probe and the Exergen scanner.

1. With the monitor off, press and hold the **Menu** button at the same time as pressing the **On/Off** button until the display test completes.
2. Press the **Menu** button until ***tdt*** (temperature display time) appears in the **Pulse Rate** window.
3. Use the **+/-** buttons to select the option.
4. To exit the configuration mode, turn the unit off. To continue with additional configuration settings, press the **Menu** button.

Advanced configuration mode

Advanced Configuration mode is entered by holding the **Menu** button and the **-** button simultaneously while powering on with the **On/Off** button.

For a few seconds immediately after power up in this mode, the **Systolic** and **Diastolic** display windows will display the major and minor version codes. The version codes are numbers that represent the letters of the English alphabet which are designated to the currently loaded version of the monitor firmware (e.g., 1 indicates A, 2 indicates B, etc.).

After a moment, this version information is cleared, and the monitor displays the first page of configuration mode which simply displays ***ACF*** in the **Systolic** display window indicating that the monitor is in advanced configuration mode.

You can then press the **Menu** button to cycle through all the advanced configuration mode option pages. After all options pages have been displayed, the display will return to the first advanced configuration mode page (displaying ***ACF***). You can use the **+** and **-** buttons to make changes to settings. After making changes, simply cycle the power to return to normal operation mode. Changes are automatically be retained.

The advanced configuration mode option pages are as follows:

Displayed on monitor	Function
ACF	Advanced Configuration Mode announcement (No settings are entered on this page.)
rEn	Remote mode ***0*** : Remote mode is disabled ***1*** : Remote mode is enabled (default)
Adr	Host communication unit address ***32*** : This is the default value: 126 max.
br	Host communication bit rate (bits per sec) ***0*** : 300 bps ***1*** : 600 bps ***2*** : 1200 bps ***3*** : 2400 bps ***4*** : 4800 bps ***5*** : 9600 bps (default) ***6*** : 19200 bps NOTE For the Exergen temperature to appear on the monitor, the host communication bit rate must be set to ***9600*** bps.
nod	Host communication mode ***0*** : Host communication command mode (default) ***1*** : 1846 Compatibility mode (1846 mode requires user to also select 600 bps.)

Service mode

Service mode is entered by holding the **Cycle** button while powering on with the **On/Off** button. You can press the **Cycle** button to advance through the available service mode pages. You can use the **+** and **-** buttons to make changes to settings.

NOTE

Only transducer calibration pages are available until calibration is valid.

Save settings

Calibration and other service mode setting changes will not be retained unless the “Save Settings” operation is executed (on the final Service Mode options page). To save settings in service mode, advance to the last page (page 6), then press and hold the **Menu** button until the second of two tones sound.

NOTE

The first tone sounds as you first press the **Menu** button and the second tone sounds after the monitor has saved the settings.

After all options pages have been displayed, the display will return to the first service mode page (initial calibration page). The Service Mode option pages are as follows:

Displayed on monitor	Function
0 (in **min** window)	Refer to calibration section for functions.
1 (in **min** window)	Refer to calibration section for functions.
2 (in **min** window)	Refer to calibration section for functions.
3 (in **min** window)	NIBP Algorithm Type loaded (Displayed in **MAP/Cuff** display window) ***1***: DINAMAP Classic NIBP ***2***: DINAMAP Auscultatory NIBP ***3***: DINAMAP SuperSTAT NIBP NOTE Changing setting effects NIBP performance.
3 (in **min** window)	Alarm mode (Displayed in **Pulse Rate** window) ***0***: IEC mode ***1***: Legacy mode NOTE ◆ Use the **Alarms** button to toggle between the available options. ◆ Refer to the "Alarms" section of the operator's manual for a detailed description of the alarm modes.
4 (in **min** window)	SpO_2 Type loaded (Displayed in **SpO2**% display window) ***0***: No SpO_2 ***1***: Nellcor ***2***: Masimo ***3***: Ohmeda NOTE Incorrect setting will cause fatal 930 alarm during operation.

Displayed on monitor	Function
5 (in **min** window)	Temperature loaded (Displayed in **Temperature** display window) ***0***: No Temp ***1***: Alaris Turbo Temp ***2***: Alaris Tri-Site ***3***: Exergen
6 (in **min** window)	Language The number displayed in **Pulse Rate** display window indicates the language setting. These range from 0 to 20. For example, 0 indicates English. The language setting is used in printed reports. Russian, Greek, Korean, and Japanese are printed in English only. ***0*** English ***1*** Not used ***2*** Czech ***3*** Danish ***4*** Dutch ***5*** Finnish ***6*** French ***7*** German ***8*** Greek ***9*** Hungarian ***10*** Italian ***11*** Japanese ***12*** Korean ***13*** Norwegian ***14*** Polish ***15*** Not used ***16*** Portuguese ***17*** Russian ***18*** Slovak ***19*** Spanish ***20*** Swedish

NOTE

You must be in option page 6 (in **min** window) to save any changes made in service mode.

Host communication connector

CAUTION

Auxiliary equipment connected to the CARESCAPE V100 vital signs monitor will result in the formation of an electromedical system and thus, must comply with the requirements of IEC 60601-1-1. All host port signals are NON-ISOLATED and should be connected to equipment conforming to IEC-60601-1 or configured to comply with IEC 60601-1-1 *only*.

Where isolation of data communication is required, use one of the following:

- ILC-1926 Isolated Line Converter (GE part number 001926) along with the Host Comm Cable Assemblies (GE part numbers 683235 and 683242).
- USB Cable Kit (GE part number 2040229-001).

If external alarm control is required, the Isolated Remote Alarm Cable (GE part number 487208CR) should *always* be used.

When a high-priority alarm condition is displayed on the monitor, the remote alarm signal becomes active within 0.5 seconds. The active state of the alarm signal is an open circuit. In the inactive state the alarm signal is connected to ground. Refer to the Information Sheet included with the Isolated Remote Alarm Cable for operational details.

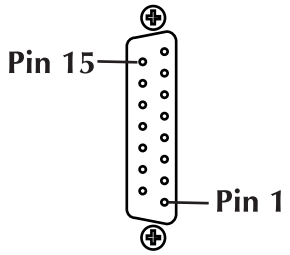
NOTE

When using the Isolated Remote Alarm Cable, the visual and audible alarms of the monitor should still be considered the primary alarm delivery method. The Remote Alarm connection should be considered a secondary method.

DB15 connector pin assignments

Connection details

Host port connector (rear panel)



Pin #	Function
1	Common
2	Inverted TTL Transmit Data
3	Inverted TTL Receive Data
4	+5 volts
5	No connection
6	No connection
7	Common
8	Remote Alarm
9	No connection
10	No connection
11	RS232 Transmit Data (TxD)
12	No connection
13	RS232 Receive Data (RxD)
14	No connection
15	No connection

Communication protocol

GE offers resources to assist customers in the development of software to exchange data with the monitor, including the Host Communications Reference Manual and the DINAWIN Application Programming Interface library. Contact your GE sales representative for further information.

4 Maintenance

Preventative maintenance

WARNING
Failure on the part of all responsible individual, hospital, or institution using this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

WARNING
Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system may cause damage to the monitor and/or the accessories, leading to impaired performance and/or inaccurate readings.

NOTE
GE does not, in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists. The sole responsibility rests with the individuals, hospitals, or institutions utilizing the device.

Maintenance schedule

To ensure the monitor and its components remain in proper operational and functional order, the following maintenance schedule is recommended:

- Visual inspection: Prior to installation, every 12 months thereafter and each time the equipment is serviced.
- Parameter level functional testing: After the initial configuration is complete.
- Calibration procedures and tests: Every 12 months, or whenever the accuracy of any reading is in doubt.
- Cleaning:
  - Monitors: Every 12 months or as usage demands.
  - Other components: As usage demands.

  For details, see "Cleaning" on page 4-3.
- Long term storage recommendations: every time the monitor is stored for an extended period of time.
- Electrical safety tests: Upon receipt of the equipment, every 12 months thereafter, and each time the unit is serviced.

Integrity of hoses and cuffs

When the pneumatic integrity of any NIBP cuff and hose is in doubt, replace the cuff and hose, and discard the questionable accessories.

Visual inspection

The monitor and its components should be carefully inspected prior to installation, once every 12 months thereafter and each time the equipment is serviced.

WARNING
Do not use damaged sensors, cables, or connectors.

- Carefully inspect the equipment for physical damage to the case, the display screen, and the keypad. Do not use the monitor if damage is determined. Refer damaged equipment to qualified service personnel.
- Inspect all external connections for loose connectors or frayed cables.
- Have any damaged connectors or cables replaced by qualified service personnel.
- Inspect the display face for marks, scratches, or other damage.
- Safety labels and inscription on the device are clearly legible.

Cleaning

Cleaning schedule

CAUTION
To prevent cross-contamination, clean the exterior surfaces of the monitor, monitor accessories, and reusable sensors on a regular basis in compliance with your institution's infection control unit and/or biomedical department's local policy.

Cleaning the monitor, monitor accessories, and the Exergen temporal scanner

WARNING
Never pour or spray water or any cleaning solution on the equipment or permit fluids to run behind switches, into connectors, into the recorder, or into any ventilation openings in the equipment. Do not let fluid "pool" around connection pins.

WARNING
Use of unapproved cleaning agents can cause case damage resulting in unintended fluid ingress and a potential for compromising electrical safety.

Cleaning the exterior surfaces of the monitor, monitor accessories, or the Exergen temporal scanner

Disconnect the monitor from AC power before cleaning or disinfecting its surface. The exterior surfaces of the monitor, monitor accessories, and temporal scanner may be cleaned with a dampened, lint-free cloth. Wipe off all cleaning solutions with a clean, dry cloth and let air dry for at least 15 minutes. Use one of the following approved solutions:

- Water
- Mild soap
- Household bleach (5.25% sodium hypochlorite). Mix 10:1 with distilled water.
- Sagrotan (dilution 3:100, containing 75 mg tartaric acid per 100 ml solution).
- Exergen temporal scanner only: Alcohol-based cleaning agents can be used on the scanner's probe head and metal neck only.

Never use the following cleaning agents on the monitor or the Exergen temporal scanner:

- Abrasive cleaners or solvents of any kind
- Acetone
- Ketone
- Betadine
- Alcohol-based cleaning agents. (However, an alcohol-based cleaning agent can be used on the Exergen scanner's probe head and metal neck only.)
- Petroleum-based cleaning agents
- Any type of solution that contains ammonium chloride, conductive solutions, wax or wax compounds
- Sodium salts

NOTE

Never autoclave or steam clean the monitor, cuffs, or accessories.

Cleaning the displays of the monitor or Exergen temporal scanner

To clean the display covers, use a soft, clean cloth dampened with a glass cleaner. Never spray the glass cleaner directly onto the display, and never use alcohol- or petroleum-based products.

Cleaning the sensor lens of the Exergen temporal scanner

Dirt, greasy film, or moisture on the scanner lens will interfere with the accuracy of the temperature reading. Regularly clean the lens with a cotton swab dipped in alcohol and follow the instruction label on the scanner. Only use gentle pressure for cleaning to avoid lens damage. Water can be used to remove any residual film left by the alcohol. Do not use bleach or other cleaning solutions on the sensor lens.

Cleaning the probe head and neck of the Exergen temporal scanner

Use an alcohol-based cleaning agent on the Exergen scanner's probe head and metal neck only.

Cleaning and disinfecting blood pressure cuffs

General

The cuff must be thoroughly cleaned with the specified detergent before reuse. The additional use of household bleach as described below provides at least intermediate-level disinfection.

NOTE

Never autoclave or steam clean the monitor, cuffs, or accessories.

- Apply cuff hose caps before cleaning. See "NIBP accessories" on page 6-2 for the orderable part numbers of cuff hose caps.
- While this procedure is adequate for cleaning/disinfection, it may not remove all stains.
- Do *not* immerse hoses.
- Do *not* immerse cuffs without prior application of the cuff hose caps.

Materials

- Enzymatic detergent such as ENZOL® enzymatic detergent (US) or Cidezyme® enzymatic detergent (UK)
- Distilled water
- 10% solution of household bleach (5.25% sodium hypochlorite) in distilled water
- Soft cloths and soft-bristled brushes
- Spray bottles

Procedure

1. Prepare the enzymatic detergent according to the manufacturer's instructions and the 10% bleach solution, in separate spray bottles.
2. Spray the detergent liberally on the cuff. If the material is dried on, allow the detergent to set for 1 minute. For soil on the soft part of the closure or the cuff itself, wipe the material off with a soft cloth. For persistent contamination on the soft part of the closure, use a soft-bristled brush to loosen particles. Rinse with copious amounts of distilled water. Repeat until no visible contamination remains. For soil on the hook part of the closure, use a soft-bristled brush to remove the material, and rinse with copious amounts of distilled water. Repeat until no visible contamination remains.
3. Spray the 10% bleach solution on the affected area until the area is saturated. Allow the solution to set for 5 minutes.
4. Wipe away any excess solution and rinse the cuff again with distilled water. Allow 2 hours for drying.

The user has the responsibility to validate any deviations from the recommended method of cleaning and disinfection.

For additional information on infection control procedures, contact GE Technical Support.

Cleaning the exterior surfaces of the Alaris temperature devices

It is good practice to periodically clean the probe's surface by wiping it with a soft cloth dampened with a mild detergent and warm water. Refer to the Housekeeping, Central Service or Infection Control departments in your facility for further information. You may use the following cleaning solutions:

- Cidex®, Betadine®, or 3% hydrogen peroxide.

NOTE

Betadine may discolor the case. Use a 10% solution of bleach to remove the discoloration. Apply the listed solutions with a dampened sponge, soft brush, or a cloth, then wipe dry with a clean cloth or towel.

CareFusion Corporation does not recommend Ethylene Oxide (EtO) sterilization of the Turbo Temp or Tri-Site temperature probes.

If you currently use a specific cleaning agent or disinfectant, we recommend that you examine its chemical ingredients prior to use on the probe. If you question the effect your specific cleaning agent or disinfectant has on your instrument, contact your local GE Healthcare sales and service office or distributor.

Do not use alcohol, ammonia, or ammonium chloride-based agents, as they could damage the plastic exterior of the probe. Do not allow fluids to enter the probe. Fluid leakage into the probe can cause damage. Do not autoclave or immerse the probe, as damage will occur.

SpO_2 sensors

Adhesive sensors are sterile and for single use only. For reusable temperature sensors, consult the sensor manufacturer instructions for cleaning, sterilization, or disinfecting methods.

Long-term storage

NOTE

When storing the product for extended periods, it is highly recommended to disconnect the battery. Otherwise, the battery may over-discharge, resulting in a significant reduction in battery life.

If it becomes necessary to store the monitor for an extended period of time, remove all attached accessories. Attach the original packing inserts, and place the monitor into the original shipping container.

Main battery life is significantly reduced if the battery is left in a discharged state. For long-term storage, fully charge the battery, then remove the battery from the unit and periodically charge the battery. For more information, refer to the "Battery care" section below.

NOTE

When the monitor's battery has been completely discharged, the monitor must be connected to an external power supply before monitoring can resume.

Long-term storage at high temperatures can lead to deterioration of seals and separators and should be avoided.

Battery care

Main battery

WARNING
Keep the monitor connected to an external DC power source when not in use to ensure maximum battery charge.

NOTE
The expected lifetime of the battery largely depends on the way in which the monitor is used. If the battery is allowed to discharge to 50%, it should survive approximately 400 charge/discharge cycles. Deeper discharge will reduce battery life expectancy. It is never recommended to fully discharge the battery.

If it becomes necessary to store the monitor for an extended period of time, first fully charge, then remove the main battery. Then store the monitor and the main battery in the original packaging materials.

Batteries should always be fully charged before being placed in storage. Even after 6 months of storage, a fully charged battery can retain about 80% of its charge. It is recommended that batteries should not be left in storage more than 6 months without a full recharge. A fully charged battery in good condition will provide sufficient power to operate a monitor for approximately 5-11 hours, depending upon configuration and use.

- With the usage scenario of auto NIBP every 5 minutes with adult cuff, printout after every determination, SpO_2 parameter active at 60 bpm, temperature parameter active in monitor mode, the average run time is 5 hours.
- With the usage scenario of NIBP determinations every 15 minutes, without SpO_2 technology and temperature function active, the run time is up to 11.5 hours.

It is best to keep the battery charged as fully as practical and never store the monitor with the battery in a discharged condition. When the battery will no longer hold a charge, remove the battery and replace it with a GE-approved battery. Failure to use a GE-approved battery may cause the monitor to shut down. Refer to "Power accessories" on page 6-13 for the reorder part number.

NOTE
After replacing batteries, an '***E00***' error code is normal. To clear the '***E00***' error code, press the **Silence** button on the monitor. The user settings and date/time revert to the factory default setting and all entries in clinical history are erased.

For units with Ohmeda TruSignal technology, it is important to verify the Line Frequency mode setting.

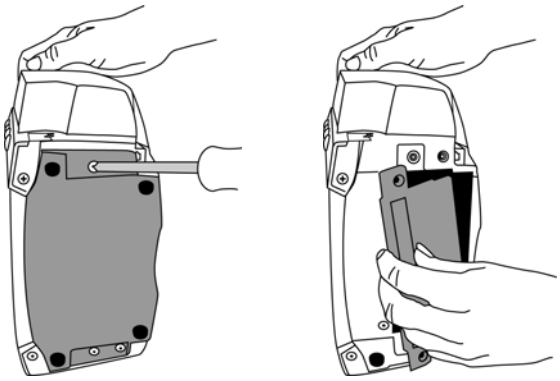
Battery charging will take place as long as the monitor remains connected to an external DC power source.

Replacing the main battery on the monitor

DANGER
Before replacing the battery, disconnect the monitor from the DC power supply.

NOTES
- Record the configuration settings on your monitor before replacing the battery. When the battery is replaced, all user settings are lost and return to default values.
- Replacement batteries can be obtained from GE.

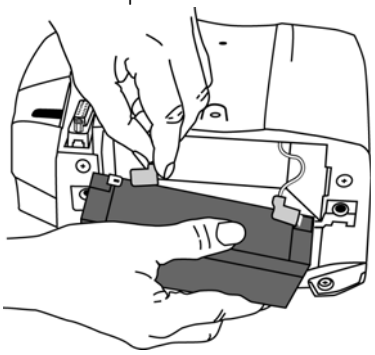
1. Unplug the monitor from the DC power source.
2. Looking at the bottom of the monitor, remove the battery compartment cover by removing the four screws that secure the cover and help card tray.
3. Remove the help card tray and battery door cover.



WARNING
When reconnecting the battery, ensure the battery maintains the correct polarity by connecting the red lead to the positive terminal and the black lead to the negative terminal.

4. Remove the old battery and disconnect the wires. Attach the battery wires to the new battery, ensuring the red terminal (**+**) is connected to the red wire and the black terminal (**-**) is connected to the black wire.
5. When reconnecting battery power, the monitor enters fatal mode. To clear the alarm, press the **On/Off** button.

6. Insert the battery into the compartment.



7. Replace the cover, help card tray, and screws. Insert the external DC power converter plug into the external DC power socket and plug into an AC outlet.

NOTES

- Error code '***E00***' appears (MEMORY LOST) alerting you that the user settings (including alarm limits and inflation pressure) and date/time will go back to default values and all entries in clinical history are erased. For units with Ohmeda TruSignal technology, it is important to verify the Line Frequency mode setting.
- Configured settings and time/date will *not* be lost when reset due to pressing and holding the **On/Off** button regardless of whether the DC charger is attached.

8. Reset the date/time and applicable user settings.
9. Verify the configuration settings prior to returning the monitor to clinical use.

Exergen temporal scanner battery

NOTE

If the Exergen scanner is not used regularly, remove the battery to prevent possible damage due to chemical leakage.

Replacing the Exergen temporal scanner battery

1. Disconnect the scanner cable from the monitor.
   a. Loosen the two thumbscrews from the scanner's modular plug.
   b. Unplug the scanner cable from the monitor's host communication port.

2. Loosen the single screw at the bottom, on the back of the scanner, and remove the battery cover.

3. Disconnect the old battery and replace with a new, high quality 9-volt alkaline battery in the same location.
4. Replace the battery cover, and tighten the screw.
5. Reconnect the scanner cable to the host communication port, and tighten the two thumbscrews.

Fuses

The monitor contains three fuses. The fuses are mounted within the monitor. The fuses protect the low voltage DC input, the main battery, and the remote alarm output. The +5 V output on the host port connector is regulated by internal supply. Fuses are not replaceable.

Parameter level functional testing

Use the accessories supplied with the monitor to perform functional testing of each of the parameters after the initial configuration is complete.

Refer to the operator's manual for more detailed parameter-specific instructions.

NIBP

1. Perform an NIBP determination on yourself.
   a. Connect the supplied air hose and cuff together.
   b. Connect the end of the air hose to the NIBP connector on the front of the monitor.
   c. Attach the adult cuff to the upper part of your arm.

      NOTE
      If you are uncertain as to the proper technique, consult the operator's manual.

   d. Press **Inflate/Stop** button on monitor to begin a determination.
2. Verify that a blood pressure determination completes and the results are displayed on the monitor.

NOTE
While an NIBP simulator device may be useful to verify that the monitor responds to oscillometric pulsations, it should not be used as a basis for assessing the accuracy of measurement. For more information, see "Appropriate use of NIBP simulators" on page B-2.

Temperature

Alaris

NOTES
- Predictive temperature measurements cannot be performed when a resistor is used in place of the probe.
- The accuracy of predictive temperature measurements made in a water bath will not be representative of performance with actual patients.

1. Connect the supplied Alaris temperature probe to the corresponding connection.
2. Take an oral or axillary temperature reading on yourself (i.e., not on a resistor simulator).
3. Verify that a predictive temperature begins once the probe is removed from its holster.
4. Place the probe in the holster after completion of the Temp cycle.

Exergen

1. Connect the Exergen temporal scanner's modular plug to the host communication port at the back of the monitor.
2. Take a temperature reading of yourself (i.e., not on a resistor simulator).
3. Verify that the temperature displays both on the Exergen temporal scanner and in the **Temperature** window on the monitor.

Ohmeda, Nellcor, and Masimo SpO_2 technologies

The SpO_2 sensor is an assembly consisting of two parts: the sensor and the extender cable.

1. Connect the cables prior to attaching to the monitor.
2. Verify that an SpO_2 reading is displayed within moments of attaching the sensor to either a simulator or to your finger.

Calibration procedures and tests

Perform the following calibration test procedures every 12 months, or whenever the accuracy of any reading is in doubt.

NOTE

All devices are tested and calibrated during manufacturing and are certified for operation at installation.

To adequately test the safety and integrity of the monitor, the following test equipment is recommended:

- 12VDC power supply
- IEC 60601-1 safety tester
- Digital manometer (with range to 350 mmHg)
- Stopwatch/timer (capable of measuring seconds)
- Adult NIBP cuff, Neonate NIBP cuff, hose, inflation bulb, and associated tubing
- Calibration kit (p/n 320246, available through GE)
- SpO_2 cable (for appropriate SpO_2 type, if SpO_2 is installed)
- TE 1811 Temperature Probe Simulator (if TEMP is installed) available from CareFusion Corporation.
- Exergen Calibration Verification Kit (if Exergen option is installed) (p/n EX129003)
- Printer paper (if printer is installed)
- 3" diameter rigid cylinder (mandrel)
- SpO_2 connector with all leads shorted
- Temperature connector with all leads shorted
- DC input connector with both wires shorted

WARNING

Calibration equipment should always be kept dry and free of particulate matter. Moisture or foreign substances introduced to the pneumatic system will likely cause damage to the monitor and/or the accessories.

Parameter test procedures

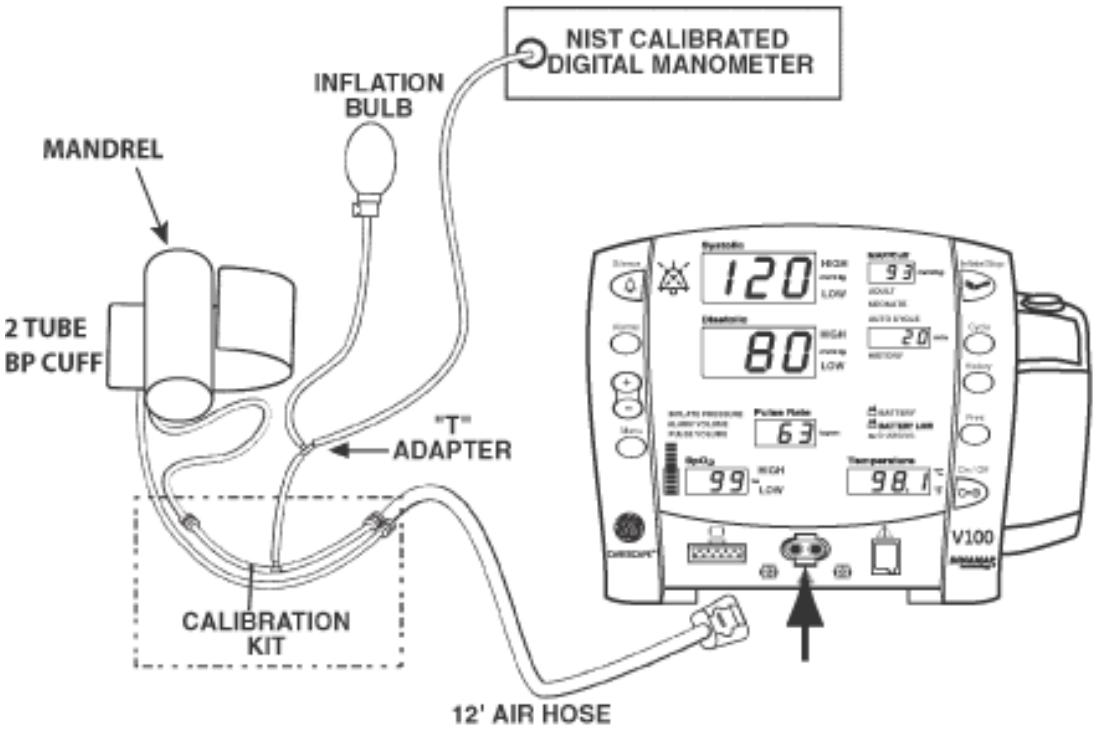
Complete the "Test results form" on page 4-29 as tests are performed.

NOTES

- This test is written so that a knowledgeable technician who is familiar with the monitor and the test equipment will be able to follow the test procedure.
- To enter Service Mode press and hold **Cycle** button while pressing the **On/Off** button.

Setup

1. Connect manometer to unit as shown.
2. 'T' an inflation bulb into the pneumatic setup.
3. Consult the following diagram for pneumatic setup guidelines.



NIBP tests

Pneumatic leakage testing

NOTE

To enter Service Mode press and hold the **Cycle** button while pressing the **On/Off** button.

1. Turn unit on and enter Service Mode.
2. Press **Cycle** button and ***1*** should appear in the **min** window.
3. Close the valve on the inflation bulb.
4. Using the inflation bulb, inflate the system to 210 mmHg.
5. Allow the system to stabilize for 5 seconds (it is normal to see some decrease in pressure at this point).
6. Start the stopwatch and record the pressure value.
7. After 60 seconds record the pressure value.

The leakage rate is the difference between the first and second readings.

8. Record and verify the leakage rate on the "Test results form" on page 4-29.
9. Turn the monitor off.

Pressure transducer verification

NOTE

To enter Service Mode press and hold the **Cycle** button while pressing the **On/Off** button.

1. Turn unit on and enter Service Mode.
2. The **min** window should display ***0***.
3. Open the valve on the inflation bulb and remove all pressure from the system (manometer reads zero).
4. Press **Cycle** button and ***1*** should appear in the **min** window.
5. Use the inflation bulb to inflate the cuff, hose and pressure indicator setup to 200 mmHg.
6. Record and verify the pressure reading that appears in the **Systolic** window.
7. Record and verify the pressure reading that appears in the **Diastolic** window.
8. Use the valve on the bulb to reduce pressure to 150 mmHg.
9. Record and verify the pressure reading that appears in the **Systolic** window.
10. Record and verify the pressure reading that appears in the **Diastolic** window.
11. Use the valve on the bulb to reduce pressure to 100 mmHg.
12. Record and verify the pressure reading that appears in the **Systolic** window.
13. Record and verify the pressure reading that appears in the **Diastolic** window.
14. Use the valve on the bulb to reduce pressure to 50 mmHg.
15. Record and verify the pressure reading that appears in the **Systolic** window.
16. Record and verify the pressure reading that appears in the **Diastolic** window.
17. Confirm all test results are recorded on the "Test results form" on page 4-29.

Pressure transducer calibration

Perform only if Pressure Transducer Verification is out of tolerance as specified in the "Test results form" **on page 4-29.**

NOTE

To enter service mode press and hold **Cycle** button while pressing the **On/Off** button.

1. Turn the monitor on and enter Service Mode.
2. The **min** window should display ***0***.
3. Open valve on bulb to open pressure system to atmosphere.
4. Verify the manometer reads zero.
5. Press **Cycle** button and ***1*** should appear in the **min** window.
6. Close valve on bulb and slowly inflate pressure to 200 mmHg (using the manometer as reference).
7. Press **Menu** button when pressure reads exactly 200 mmHg to set calibration value.
8. To save the calibration setting, press the **Cycle** button until ***6*** appears in the **min** window.
9. Press and hold **Menu** button until monitor beeps and the number in the **MAP/Cuff** window decrements by 1, which acknowledges that data was saved.
10. Turn the monitor off.

Overpressure verification

NOTE

To enter service mode press and hold **Cycle** button while pressing the **On/Off** button.

1. Wait a few seconds after entering service mode. Press **Cycle** button so that the **min** window changes from **0** to **1**.
2. Use the inflation bulb to inflate close to 300 mmHg. Slowly inflate (1 to 2 mmHg/sec) until valve opens and pressure is released.
3. Record and verify pressure at which valve opens on the "Test results form" on page 4-29.
4. Press **Cycle** button and ***2*** should appear in the **min** window.
5. Use the inflation bulb to inflate close to 150 mmHg. Slowly inflate (1 to 2 mmHg/sec) until valve opens and pressure is released.
6. Record and verify pressure at which valve opens on the "Test results form" on page 4-29.
7. Turn unit off.

Button testing

1. Disconnect the cuff/hose assembly and power on the unit.
2. Press **Inflate/Stop** button.
3. Verify a NIBP determination has been initiated.
4. Block pump port and verify '***E80***' alarm.
5. Press **Silence** button, verify alarm has been cleared.
6. Verify that the alarm silence indicator (bell) is lit.
7. Press **Alarm** button several times, verify unit cycles through all alarm settings (i.e., ***SYS***, ***DIA***, ***SpO2***).
8. Confirm all test results are recorded on the "Test results form" on page 4-29.
9. Turn unit off.

NIBP functional test

NOTES

- The NIBP function test does not test for measurement accuracy.
- While an NIBP simulator device may be useful to verify that the monitor responds to oscillometric pulsations, it should not be used as a basis for assessing the accuracy of measurement. For more information, see "Appropriate use of NIBP simulators" on page B-2.

1. Remove the calibration setup and attach an adult cuff and hose to a simulator (be sure to select the correct cuff size).
2. Press **Inflate/Stop** button on monitor to begin a determination.
3. Record **Systolic**, **Diastolic**, **MAP** and heart rate from the monitor display.
4. Wait 1 minute, then press **Cycle** button to initiate a determination in Auto NIBP mode.
5. Record **Systolic**, **Diastolic**, **MAP** and heart rate from the monitor display.
6. Wait 1 minute, then press **Cycle** button until ***stat*** is displayed in the **min** window to initiate a determination in ***STAT*** mode.
7. Record **Systolic**, **Diastolic**, **MAP** and heart rate from the monitor display.
8. Press **Inflate/Stop** button, end ***STAT*** mode.
9. Confirm all test results are recorded on the "Test results form" on page 4-29.

NIBP overpressure verification

1. Remove the cuff/hose from the monitor, restrict airflow from cuff hose port.
2. Press **Inflate/Stop** to begin NIBP determination.
3. Verify '***E80***' is displayed on the **Systolic** window and audible alarm sounds.
4. Remove the air restriction.
5. Press **Inflate/Stop** and verify that the pump does not start.
6. Press the **Silence** button.

7. Press the **Silence** button again.
8. Verify the alarm condition is cleared from the **Systolic** window.
9. Confirm all test results are recorded on the "Test results form" on page 4-29.

LED tests

1. Power on the monitor.
2. During the power-up self-test verify all 7 segment LEDs and all discrete LEDs illuminate and they are the correct color.

   NOTE

   In the following figure, the items with a solid border are segment LEDs, and the items with a dotted border are discrete LEDs.

3. Repeat power up cycle until all LEDs are checked.
4. Confirm all test results are recorded on the "Test results form" on page 4-29.

External DC verification

1. Plug the power supply into the monitor.
2. Verify that the ***CHARGING*** indicator is illuminated.
3. Confirm all test results are recorded on the "Test results form" on page 4-29.

Temperature (perform if equipped with Temp module)

At installation, GE recommends performing a temperature check. Refer to "Parameter level functional testing" - "Temperature" on page 4-11.

Alaris temperature calibration verification

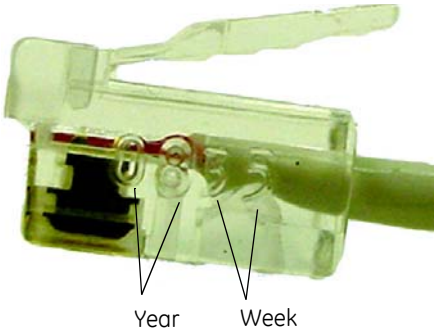
NOTES

- There are no user-performed maintenance or calibration procedures for Alaris thermometry.
- To verify the accuracy of the Alaris temperature parameter with a specific temperature probe, take measurements at varying temperatures in continuous (monitor) mode using a water bath and a high-precision thermometer as a reference instrument.

1. Turn the monitor off. Make sure the temperature probe is properly stored in the probe well.
2. Disconnect the temperature probe cable from the monitor.
3. Connect Temp simulator; set to 80.2°F.
4. Turn the monitor on.
5. If your measurement units are set to °C, switch the measurement units to °F. Refer to "Temperature unit of measurement configuration settings" on page 3-10 for instructions.
6. Put the monitor into temperature monitor mode:
   a. Remove the probe from the well.
   b. Press the **+** key.
   c. Verify that a blinking temperature appears quickly. If not, return the probe to the holder and repeat steps 6a and 6b.
7. Record and verify the reading in the temperature display is 80.2°F ±0.2°F.
8. Set the simulator to 98.6°F.
9. Record and verify the reading in the temperature display is 98.6°F ±0.2°F.
10. Set the simulator to 107.8°F.
11. Record and verify the reading in the temperature display is 107.8°F ±0.2°F.
12. If necessary, switch the measurement units to °C. Refer to "Temperature unit of measurement configuration settings" on page 3-10 for instructions.
13. Confirm all test results are recorded on the "Test results form" on page 4-29.
14. Calibration is complete. If the monitor does not pass the calibration verification, contact GE Technical Support.

Alaris temperature probe date of manufacture

If required for your maintenance procedures, the Alaris temperature probe's date of manufacture is stamped into the probe's RJ45 connector. The first two digits equal the year of manufacture, the second two digits equal the week of manufacture. In the example below, 0835 equals fiscal week 35 in the year of 2008.



Exergen temperature calibration verification

The Exergen temporal scanner is self-calibrating. Factory calibration data is installed via a computer that communicates with the temporal scanner's microprocessor. The instrument uses this data to self-calibrate automatically each time it is turned on, and will never require recalibration. If readings are not correct, the instrument should be returned for repair.

NOTE

If calibration is needed, return the unit to the manufacturer.

Calibration verification kit

The calibration verification procedure requires the Exergen Calibration Verification Kit (p/n EX129003). The calibration verification kit includes a portable blackbody heat generator providing a stable source of heat in a small cavity. This is used as a target reference to verify the calibration of the Exergen temporal scanner against an Exergen Certified Master (CM) reference instrument, also included in the kit.

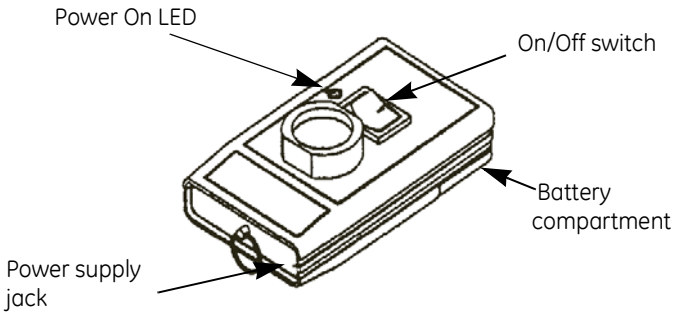
Calibration verification procedure

The CM instrument must be the same model and calibration as the units to be tested (S/N labels on the instruments indicate if device is Oral or Arterial and F or C). If this is not the case, contact GE Technical Support.

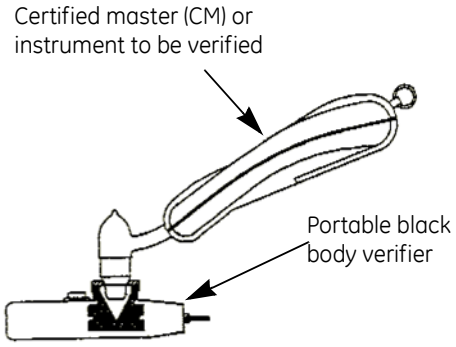
NOTE

Comparisons between the CM and the instrument being tested should always be conducted under the same conditions.

1. Turn on the verifier device, using either a 9-volt battery or the power supply. Make sure the red LED is illuminated.



2. Allow device approximately 5 minutes for warm-up and stabilization time.
3. Allow certified master and the instrument to be tested to acclimate in the same ambient temperature for at least 10 minutes.
4. For all instruments, make sure the lens at the tip of the probe is clean. To clean, use an alcohol prep or a swab dipped in alcohol, followed by a damp wipe with water to remove any residue.
5. Alternately insert the reference instrument and the instrument being verified into the aperture opening, comparing the readings.



6. Record and verify the difference between the temperature reading of the CM and the instrument being verified is ±0.2°C (0.4°F).

   If the readings differ by more than the acceptable field limits, repeat this procedure. If the readings still differ by more than the acceptable limits, the device fails.

7. Confirm test results are recorded on the "Test results form" on page 4-29.

SpO_2 (perform only if equipped with SpO_2 module)

1. Connect the appropriate SpO_2 probe and cable to the SpO_2 connector. Place the probe on your finger.
2. Verify the unit displays a:
   - Pulse value
   - Saturation value
   - Signal Strength Bar Graph

3. Remove the sensor from your finger to generate a '**---**' (SpO_2 SENSOR OFF FINGER) alarm and to sound the speaker.
4. Press the **Silence** button.
5. Verify the sound has stopped and the '**---**' (SpO_2 SENSOR OFF FINGER) error is cleared.
6. Re-apply the SpO_2 sensor to your finger.
7. Verify the unit displays a:
   - Pulse value
   - Saturation value
   - Signal Strength Bar Graph
8. Confirm all test results are recorded on the "Test results form" on page 4-29.

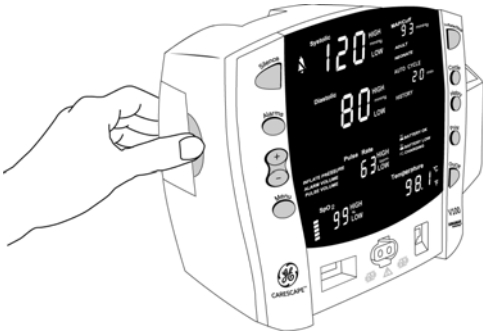
Printer output test

1. Load paper into the print mechanism.

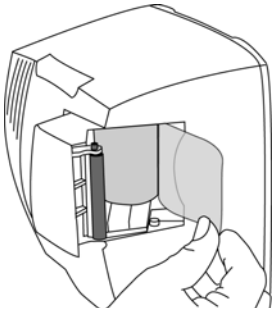
   NOTE
   Use only printer paper from GE.

   a. With the monitor powered on, turn it so that the side with the printer is facing you.

   b. While grasping the side of the monitor, lift the printer door open by placing your thumb in the indented area and pulling. The printer door will pop open.



   c. Place the roll of paper into the compartment so that the end of the paper comes off the right-side of the roll (paper is wound around the roll clockwise). Place the roll of paper in the holding bracket that is integrated in the door of the printer, making sure the paper extends out of the printer cavity at least two inches.



2. Firmly press the door to close it.
3. Press **Print** button.
4. Verify the printer outputs a record and print quality is good.
5. Confirm test results are recorded on the "Test results form" on page 4-29.

Safety testing

Electrical safety tests

Electrical safety tests provide a method of determining if potential electrical health hazards to the patient or operator of the device exist.

Recommendations

Qualified personnel must perform all safety tests presented in this document:

- Upon receipt of the monitor and its associated equipment).
- Every 12 months thereafter (Planned/Preventive Maintenance). Refer to the "Maintenance schedule" on page 4-2 for more information.
- Each time the main enclosure is disassembled or a circuit board is removed, tested, repaired, or replaced (Corrective Maintenance).
- GE recommends that the qualified personnel performing the tests should record the values of each required electrical safety test in the "Test results form" on page 4-29. These instructions are intended for any component in the system requiring electrical safety testing.

Test equipment

The recommended test equipment required to perform electrical safety tests is listed below.

Item	Specification
Leakage Current Tester	Equivalent to the circuits shown
Digital Multimeter (DMM) (optional, based upon leakage tester and location)	AC volts, ohms
SpO2 Test Body	2006036-001
Safety Testing Cable Kit NOTE This kit contains the Temperature Test Body.	2026107-006

Perform electrical safety tests using an electrical safety analyzer per IEC 60601-1, UL 60601-1, or CSA C22.2 No. 601. The schematics in the section provide a general understanding of the test equipment. Actual configuration of test equipment may vary.

The monitor being tested should be placed on an insulating surface.

Power outlet test

Verify that the power outlet is wired correctly per the country's electrical code standard before starting the following electrical safety tests. The results of the following tests will be inaccurate unless a properly wired power outlet is used. Use only non-isolated power outlets when performing safety tests.

Power cord and plug

Verify the power cord being used with the patient monitor is good. The following are several areas to check for in this regard:

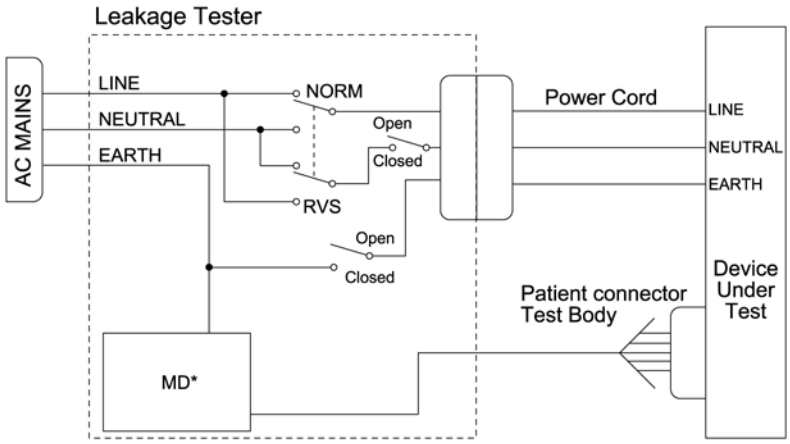
- Failure of the power cord strain relief is very common. Often times users of the equipment pull on the power cord itself, rather than the power cord plug, to unplug the patient monitor from a wall receptacle.
- Inspect the power cord for wear or damage regularly. If damage is suspected, test for continuity through each conductor of the power cord connector.
- Verify line, neutral, and earth conductors are properly connected to the power cord plug and are not short-circuited. Replace the power cord, as necessary, with a regulatory-approved cord for the country of use.

WARNING
Use only AC power cords recommended or manufactured by GE.

Patient leakage current test

This procedure measures the leakage current from the "Device Under Test" input connector to ground.

Perform tests in both Normal Condition (NC) and in Single Fault Condition (SFC), where one of the supply conductors is open at a time. Perform the test with normal and reverse polarity.



NOTE

*The MD represents the network and voltage measuring instrument and its frequency characteristics per IEC 60601-1.

The patient connector test body shorts all signals in the connector together. Refer to the instructions contained with the safety analyzer to perform this test.

NOTES

- Perform this test once for SpO_2 and once for Temperature.
- This test applies only to the Alaris temperature option; it is not intended for the Exergen temperature option.

1. Connect the appropriate Test Body to the input connector of the device under test.
2. Configure leakage tester as follows:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
3. Apply the AC mains voltage to the device under test.
4. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
5. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – OPEN
   - GND (Earth) – CLOSED

6. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
7. Change leakage tester switches to:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – OPEN
8. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
9. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – OPEN
10. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
11. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – OPEN
   - GND (Earth) – CLOSED
12. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
13. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
14. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
15. Remove the AC mains voltage from the device under test.
16. Repeat the steps in this procedure using the appropriate Test Body for any additional devices requiring safety testing.

If measured reading is greater than the acceptance criteria below, the device under test fails. Contact GE Technical Support.

Acceptance criteria NC

All readings must be less than or equal to 100 µA.

Acceptance criteria SFC – ground (earth), line or neutral open

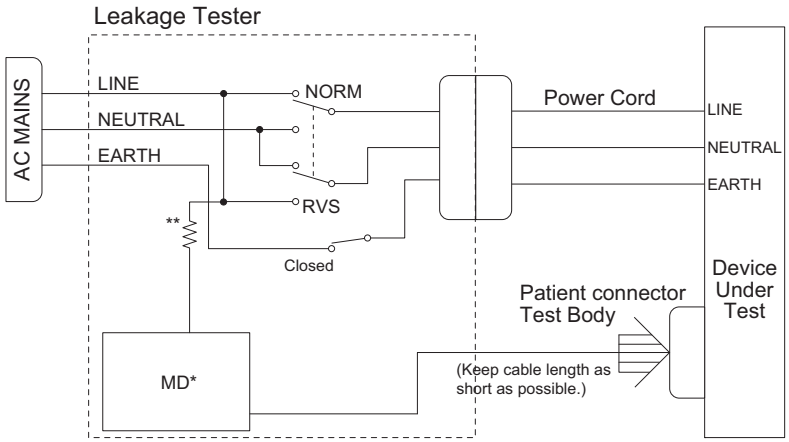
All readings must be less than or equal to 500 µA.

Patient leakage current test (mains voltage on the applied part)

This procedure measures the leakage current from a mains voltage source into the “Device Under Test” input connector.

The patient connector test body shorts all signals in the connector together. Refer to the instructions contained with the safety analyzer to perform this test. Connect the appropriate Test Body to the input connector of the device under test.

Perform the test with normal and reverse polarity.



NOTE

*The MD represents the network and voltage measuring instrument and its frequency characteristics per IEC 60601-1.

**Per IEC 60601-1, the resistance to protect the circuitry and the person performing the test. The resistance must be low enough to accept currents higher than the allowable values of the leakage current to be measured.

WARNING

Shock hazard. The following step causes high voltage at the test body. Do not touch the test body.

NOTE

Perform this test once for SpO_2 and once for Temperature.

1. Configure leakage tester as follows:
   - Polarity – NORMAL
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
2. Apply the AC mains voltage to the device under test.
3. Read the current leakage indicated on the tester and record the results on the “Test results form” on page 4-29.

4. Change leakage tester switches to:
   - Polarity – REVERSED
   - Neutral – CLOSED
   - GND (Earth) – CLOSED
5. Read the current leakage indicated on the tester and record the results on the "Test results form" on page 4-29.
6. Remove the AC mains voltage from the device under test.
7. Repeat the steps in this procedure using the appropriate Test Body for any additional patient connectors requiring safety testing.

If measured reading is greater than the acceptance criteria below, the device under test fails. Contact GE Technical Support.

Acceptance criteria

All readings must be less than or equal to 5 mA.

Test results form

Description	Min	Max	Actual	Pass-Fail-N/A
NIBP Tests				
■ **Pneumatic leakage result (mmHg)**	0	6		
■ **Pressure transducer verification**				
Pressure reading at 200mmHg, top display - **Systolic**	197	203		
Pressure reading at 200mmHg, bottom display - **Diastolic**	197	203		
Pressure reading at 150mmHg, top display - **Systolic**	147	153		
Pressure reading at 150mmHg, bottom display - **Diastolic**	147	153		
Pressure reading at 100mmHg, top display - **Systolic**	97	103		
Pressure reading at 100mmHg, bottom display - **Diastolic**	97	103		
Pressure reading at 50mmHg, top display - **Systolic**	47	53		
Pressure reading at 50mmHg, bottom display - **Diastolic**	47	53		
■ **Overpressure verification**				
Overpressure threshold, Adult (mmHg)	305	325		
Overpressure threshold, Neonate (mmHg)	150	165		
■ **Buttons**				
NIBP Determination Initiated				
'***E80***' displayed on **Systolic** display				
Audible alarm can be silenced				
Alarm silence indicator (bell) is lit				
Overpressure alarm can be cleared				
Alarm button is functioning				
■ **NIBP determination**				
Systolic reading (mmHg)				
Diastolic reading (mmHg)				
MAP reading (mmHg)				
Heart rate reading (bpm)				
Systolic reading (mmHg)				
Diastolic reading (mmHg)				
MAP reading (mmHg)				
Heart rate reading (bpm)				
Systolic reading (mmHg)				
Diastolic reading (mmHg)				
MAP reading (mmHg)				

Description	Min	Max	Actual	Pass-Fail-N/A
Heart rate reading (bpm)				
■ **NIBP overpressure**				
'***E80***' displayed on **Systolic** display				
Pump will not start				
Overpressure alarm can be cleared				
Display				
All 7-Segment LEDs Light Correct Color				
All Discrete LEDs Light, Correct Color				
External DC detection				
CHARGING indicator LED illuminated				
Temperature test				
■ **Alaris**				
Temperature reading at 80.2° F	79.9° F	80.5° F		
Temperature reading at 98.6° F	98.4° F	98.8° F		
Temperature reading at 107.8° F	107.5° F	108.1° F		
■ **Exergen**				
Temperature reading of reference instrument				
Temperature reading of instrument being verified				
Difference between temperature reading of reference instrument and instrument being verified		±0.2° C (0.4° F)		
SpO_2				
Pulse Value Displayed				
Saturation Value Displayed				
Signal Strength Bar				
'**---**' displayed on **SpO_2** display				
Alarm is silenced, error display remains				
Pulse Value				
Saturation Value Displayed				
Signal Strength Bar				
Printer test				
Printout is generated cleanly				
Safety testing				
■ **Patient leakage**				
Fwd Pol, Neut Clsd, Gnd Clsd		100µA		
Fwd Pol, Neut Open, Gnd Clsd		500µA		
Fwd Pol, Neut Clsd, Gnd Open		500µA		
Rev Pol, Neut Clsd, Gnd Open		500µA		

Description	Min	Max	Actual	Pass-Fail-N/A
Rev Pol, Neut Open, Gnd Clsd		500µA		
Rev Pol, Neut Clsd, Gnd Clsd		100µA		
■ **Patient leakage current (mains on applied part)**				
Fwd Pol, Neut Clsd, Gnd Clsd		5mA		
Rev Pol, Neut Clsd, Gnd Clsd		5mA		

5 Troubleshooting

Overview

The symptoms and solutions in this chapter represent only a few of the problems that you may encounter and are not intended to cover every possible problem that may occur.

A systematic approach to the diagnosis of problems as well as a general understanding of the architecture, both hardware and software, of the monitor are essential to ensure successful troubleshooting of a device. GE recommends formal service training before repairs are attempted. These troubleshooting procedures combined with training provide the service technician with skills necessary to service and repair a monitor in the event of a malfunction.

Problems

Before starting any detailed troubleshooting, complete a thorough visual inspection of the following.

- All cable connections secure?
- Devices properly powered?
- Connected to a proper power source?

Problem	Possible reason	Solution
Exergen temperature does not appear on the monitor	The host communication bit rate may be set incorrectly.	Confirm that the host communication bit rate (br) is set at the default setting (***9600***). Refer to "Advanced configuration mode" on page 3-11 on how to determine the bit rate.
	Loss of electrical contact between the scanner and the monitor (e.g., corrosion on the connector inside the scanner).	If the scanner appears to be working properly, but will not communicate with the monitor: 1. Verify that the connector is properly connected. 2. Verify that the battery door is securely fastened. If there is still no communication with the monitor: 1. Plug and unplug the connector several times. 2. Rub off any corrosion on the connector inside the scanner.

Alarm code interpretation

General system error codes are listed in this section. If any other system or similar code appears, record the error message and report the failure to GE Technical Support. Refer to the operator's manual for information about patient alarms and general procedural alarms.

System failures

System failure mode is entered when the monitor has a depleted battery, or a hardware or software failure. A distinctive alarm tone is generated for up to 5 minutes, after which if the monitor isn't turned off, it shuts down completely.

When a system failure is encountered, the error code is displayed on the screen for > 5 seconds and the system enters FAILSAFE mode. The error code is logged in the history log.

If the **On/Off** button remains depressed for between 10 and 20 seconds, a special situation occurs. It forces a reset and produces a fatal alarm without a displayed code.

Alarm conditions and error codes

When responding to a monitor alarm, always *check the patient first* and then check the monitor, cuff, hose and sensors. Press **Silence** to clear patient alarm conditions.

Error log

You can view and print an error log that stores up to 40 error code entries. The log is a "rolling" list that—once 40 entries are stored—deletes the oldest entry in order to add the most recent entry. The error log is saved until the monitor experiences a memory loss, then all entries are deleted.

Procedure to view and print error code history log

1. Enter the Advanced Configuration Mode (ACF) by holding down the **Minus** (**-**) and **Menu** buttons while powering up the monitor (pressing the **On/Off** button).
2. The monitor briefly displays the software revision, then displays ***ACF*** in the **Systolic** window.
3. The monitor is now in Advanced Configuration Mode.
4. To view the error log use the **History** button to step through the log in reverse order of when the error occurred (oldest appears first).
5. The **Systolic** window shows the Year the error occurred.
6. The **Diastolic** window shows the Day the error occurred.
7. The **MAP** window shows the Month the error occurred.
8. The **min** window shows the Time the error occurred.

9. The **Pulse Rate** window shows the error code that occurred at the recorded time.
10. To print the error log, press the **Print** button while viewing the log.

Error codes

Error code or problem	Source	Definition	Can be acknowledged (silenced)?*	Probable source
Display blank, high pitch alarm	System	FAILSAFE error	No	Mains PWA issue
920	NIBP	Comm timeout between main processor and NIBP subprocessor	No	Mains PWA issue
921	NIBP	Startup communication failure with NIBP processor	No	Mains PWA issue
922	NIBP	NIBP processor reports communication timeout	No	Mains PWA issue
923	NIBP	Determination time too long	No	Mains PWA issue
930	SpO_2	No status from module for 60 ±10 sec. Fatal error reported by module	No	■ Verify SpO_2 configuration is correct type ■ Parameter turned on - no hardware installed in unit
940	Temp	TEMP data samples less than 45 in 5 sec while idle	No	Mains PWA issue
950	NIBP	NIBP pump on during idle or over current detected	No	Pneumatic assembly failure
951	NIBP	NIBP valve stuck closed during cuff typing	No	Pneumatic assembly failure
952	NIBP	NIBP PT2 higher than 150 for greater than 15 seconds while idle	No	Pneumatic assembly failure
970	Printer	Time base failure	No	Mains PWA issue
971	System	RAM test failure	No	Mains PWA issue
972	System	ROM checksum failure	No	Mains PWA issue
973	System	Secondary processor communication error during initialization	No	Mains PWA issue
974	System	Calibration data invalid on initialization or unit never calibrated	No	■ Calibrate unit ■ Mains PWA issue
975	System	Could not save calibration data	No	Mains PWA issue

Error code or problem	Source	Definition	Can be acknowledged (silenced)?*	Probable source
976	System	Power supply voltage has peaked above 18 Volts (incorrect power supply)	No	External power brick issue
979	System	Unknown power processor mode received on power-up	No	Mains PWA issue
980	System	Heap memory exhausted	No	Mains PWA issue
984	System	Unused vector called	No	Return unit for evaluation
985	System	RTK 400hz timer re-entry	No	Return unit for evaluation
986	System	RTK 50hz timer re-entry	No	Mains PWA issue
989	System	RTK overrun	No	Mains PWA issue
994	System	Stack overflow	No	Mains PWA issue
999	System	Background task stalled	No	Mains PWA issue
E10	Printer	Printer no paper	Yes	No paper in printer Printer problem
E11	Printer	Printer too hot	Yes	Printer problem
E13	Battery	Main battery low	Yes	■ Battery too low to operate the unit ■ Charge battery ■ External DC source failed ■ Replace battery
BATTERY LOW	Battery	Main battery is running low	Yes	Plug monitor in to recharge
E00	Battery	Memory lost	Yes	■ Usually noted after changing batteries. ■ User settings and date/time revert to default settings. ■ All entries in clinical history are erased. ■ For units with Ohmeda TruSignal technology, verify the Line Frequency (LF) mode setting. Refer to "SpO2 configuration settings" on page 3-9.
---	SpO_2	SpO_2 Sensor off finger	Yes	Reposition SpO_2 sensor
E20	SpO_2	SpO_2 sensor disconnected	Yes	Sensor disconnected
E21	SpO_2	SpO_2 replace sensor	Yes	Replace SpO_2 sensor
E25	SpO_2	SpO_2 lost pulse	Yes	Reposition SpO_2 sensor

Error code or problem	Source	Definition	Can be acknowledged (silenced)?*	Probable source
E61	Temp	Temp probe broken (Alaris only)	No	Replace temperature probe
E63	Temp	Temp probe disconnected (Alaris only)	Yes	Check for correct probe
E66	Temp	Temp probe too hot (Alaris only)	Yes	Replace probe
E--	Temp	Temp scanner error (Exergen only)	Yes	Check Exergen battery, and check for valid temperature value. Also check the scanner's display for Exergen error information. Refer to the "Exergen-specific error codes" section for more information.
E80	NIBP	Overpressure	Yes	Excess cuff pressure. Check for pinched or occluded internal tubing.
E82	NIBP	Excess air in cuff	Yes	Determination cannot be made due to an excess amount of air in the cuff.
E83	NIBP	NIBP pump timeout	Yes	■ Leak in cuff or o-ring in hose ■ Internal leak in tubing or pneumatic valve ■ Pump not turning on Check or replace hose or cuff.
E84	NIBP	NIBP total timeout	Yes	Length of time has exceeded 2 minutes for an adult/pediatric determination or 85 seconds for a neonate determination.
E85	NIBP	NIBP level timeout	Yes	Remained at one cuff pressure level for more than 1 minute.
E89	NIBP	NIBP no determination	Yes	Cuff placement on patient
***Acknowledging an alarm by pressing the **Silence** button, cancels and resets the alarm condition.				

Exergen-specific error codes

If the scanner is unable to take a temperature determination, or has a low battery, the monitor will display the '***E--***' error code and generate an audible alarm. The scanner may also display additional indicators on the LED display.

Exergen LED display	Condition	Description
HI	High Target	> 43 °C (110 °F)
LO	Low Target	< 16 °C (61 °F)
HI A	High Ambient	> 40 °C (104 °F)
LO A	Low Ambient	< 16 °C (60 °F)
bAtt	Low Battery	Replace battery soon.
(blank display)	Dead Battery	Replace battery.
Err	Processing Error	Restart scanner. If unit is defective, it will have to be returned to the manufacturer. Contact GE Technical Support.

For your notes

6 Parts lists and drawings

Ordering parts

This section of the manual provides parts lists for the monitor. Parts lists should be used in conjunction with the other chapters of this manual.

GE makes every effort possible to provide the most up-to-date reference documentation for your equipment. However, in special cases involving field-installed upgrades, the revision level of a diagram or parts list in this manual may not reflect the revision level of your unit's subassemblies. When discrepancies are found, contact your GE Service Representative.

NOTE

Fabrication drawings are not contained in this manual.

Compatible service parts

NIBP accessories

Part	Part description	Part number
NIBP, Cuff, Soft Cuff, Child	SOFT-CUF, Child, 2 TB, Mated Submin, Green/White 12 - 19 cm	2451
NIBP, Cuff, Soft Cuff, Sm Adult	SOFT-CUF, Small Adult, 2 TB, Mated Submin, Lt. Blue/White 17 - 25 cm	2452
NIBP, Cuff, Soft Cuff, Adult	SOFT-CUF, Adult, 2 TB, Mated Submin, Navy/White 23 - 33 cm	2453
NIBP, Cuff, Soft Cuff, Adult Long	SOFT-CUF, Adult Long, 2 TB, Mated Submin, Navy/White 23 - 33 cm	2454
NIBP, Cuff, Soft Cuff, Lg Adult	SOFT-CUF, Large Adult, 2 TB, Mated Submin, Rose/White 31 - 40 cm	2455
NIBP, Cuff, Soft Cuff, Lg Adult Long	SOFT-CUF, Large Adult Long, 2 TB, Mated Submin, Rose/White 31 - 40 cm	2456
NIBP, Cuff, Soft Cuff, Thigh	SOFT-CUF, Thigh, 2 TB, Mated Submin, Brown/White 38 - 50 cm	2457
NIBP, Cuff, Soft Cuff, Infant	SOFT-CUF, Infant, 2 TB, Submin, Orange/White 8 - 13 cm	2401
NIBP, Cuff, Soft Cuff, Child	SOFT-CUF, Child, 2 TB, Submin, Green/White 12 - 19 cm	2402
NIBP, Cuff, Soft Cuff, Child Long	SOFT-CUF, Child Long, 2 TB, Submin, Green/White 12 - 19 cm	2400
NIBP, Cuff, Soft Cuff, Sm Adult	SOFT-CUF, Small Adult, 2 TB, Submin, Lt. Blue/White 17 - 25 cm	2403
NIBP, Cuff, Soft Cuff, Sm Adult Long	SOFT-CUF, Small Adult Long, 2 TB, Submin, Lt. Blue/White 17 - 25 cm	2407
NIBP, Cuff, Soft Cuff, Adult	SOFT-CUF, Adult, 2 TB, Submin, Navy/White 23 - 33 cm	2404
NIBP, Cuff, Soft Cuff, Adult Long	SOFT-CUF, Adult Long, 2 TB, Submin, Navy/White 23 - 33 cm	2116
NIBP, Cuff, Soft Cuff, Lg Adult	SOFT-CUF, Large Adult, 2 TB, Submin, Rose/White 31 - 40 cm	2405
NIBP, Cuff, Soft Cuff, Lg Adult Long	SOFT-CUF, Large Adult Long, 2 TB, Submin, Rose/White 31 - 40 cm	2117
NIBP, Cuff, Soft Cuff, Thigh	SOFT-CUF, Thigh, 2 TB, Submin, Brown/White 38 - 50 cm	2406

Part	Part description	Part number
NIBP, Cuff, Soft Cuff, Infant	SOFT-CUF, Infant, 2 TB, Screw, Orange/White 8 - 13 cm	2500
NIBP, Cuff, Soft Cuff, Child	SOFT-CUF, Child, 2 TB, Screw, Green/White 12 - 19 cm	2501
NIBP, Cuff, Soft Cuff, Child Long	SOFT-CUF, Child Long, 2 TB, Screw, Green/White 12 - 19 cm	2506
NIBP, Cuff, Soft Cuff, Sm Adult	SOFT-CUF, Small Adult, 2 TB, Screw, Lt. Blue/White 17 - 25 cm	2502
NIBP, Cuff, Soft Cuff, Sm Adult Long	SOFT-CUF, Small Adult Long, 2 TB, Screw, Lt. Blue/White 17 - 25 cm	2507
NIBP, Cuff, Soft Cuff, Adult	SOFT-CUF, Adult, 2 TB, Screw, Navy/White 23 - 33 cm	2503
NIBP, Cuff, Soft Cuff, Adult Long	SOFT-CUF, Adult Long, 2 TB, Screw, Navy/White 23 - 33 cm	2604
NIBP, Cuff, Soft Cuff, Lg Adult	SOFT-CUF, Large Adult, 2 TB, Screw, Rose/White 31 - 40 cm	2504
NIBP, Cuff, Soft Cuff, Lg Adult Long	SOFT-CUF, Large Adult Long, 2 TB, Screw, Rose/White 31 - 40 cm	2644
NIBP, Cuff, Soft Cuff, Thigh	SOFT-CUF, Thigh, 2 TB, Screw, Brown/White 38 - 50 cm	2505
NIBP, Cuff, Soft Cuff, Various	SOFT-CUF, Assortment, 2 TB, Submin: 1 Infant, 1 Child, Various limb circum: 2 Small Adult, 2 Adult, 1 Adult Long, 2 Large Adult, 1 Thigh	2298
NIBP, Cuff, Soft Cuff, Various	SOFT-CUF, Assortment Pack: 2 TB, Screw, 1 Infant, 1 Child, 2 Small Adult, 2 Adult, 1 Adult Long, 2 Large Adult, 1 Thigh	002695
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal #1, 2 TB, Male Slip, Orange/White 3 - 6 cm	2521
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal #2, 2 TB, Male Slip, Lt. Blue/White 4 - 8 cm	2422
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal #3, 2 TB, Male Slip, Green/White 6 - 11 cm	2523
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal #4, 2 TB, Male Slip, Navy/White 7 - 13 cm	2524
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal #5, 2 TB, Male Slip, Rose/White 8 - 15 cm	2525
NIBP, Cuff, Soft Cuff, Neonate	SOFT-CUF, Neonatal Assortment, 2 TB, Male Slip: Various limb circum: 2 Neonatal #1, 3 Neonatal #2, 5 Neonatal #3, 5 Neonatal #4, 5 Neonatal #5	2694
NIBP, Cuff, Classic Cuff, Child	CLASSIC-CUF, Child, 2 TB, Mated Submin, Green/White 12 - 19 cm	2171
NIBP, Cuff, Classic Cuff, Sm Adult	CLASSIC-CUF, Small Adult, 2 TB, Mated Submin, Lt. Blue/White 17 - 25 cm	2172
NIBP, Cuff, Classic Cuff, Adult	CLASSIC-CUF, Adult, 2 TB, Mated Submin, Navy/White 23 - 33 cm	2173
NIBP, Cuff, Classic Cuff, Adult Long	CLASSIC-CUF, Adult Long, 2 TB, Mated Submin, Navy/White 23 - 33 cm	2174
NIBP, Cuff, Classic Cuff, Lg Adult	CLASSIC-CUF, Large Adult, 2 TB, Mated Submin, Rose/White 31 - 40 cm	2175

Part	Part description	Part number
NIBP, Cuff, Classic Cuff, Lg Adult Long	CLASSIC-CUF, Large Adult Long, 2 TB, Mated Submin, Rose/White 31 - 40 cm	2176
NIBP, Cuff, Classic Cuff, Thigh	CLASSIC-CUF, Thigh, 2 TB, Mated Submin, Brown/White 38 - 50 cm	2177
NIBP, Cuff, Classic Cuff, Infant	CLASSIC-CUF, Infant, 2 TB, Submin, Orange/White 8 - 13 cm	2354
NIBP, Cuff, Classic Cuff, Child	CLASSIC-CUF, Child, 2 TB, Submin, Green/White 12 - 19 cm	2355
NIBP, Cuff, Classic Cuff, Sm Adult	CLASSIC-CUF, Small Adult, 2 TB, Submin, Lt. Blue/White 17 - 25 cm	2356
NIBP, Cuff, Classic Cuff, Adult	CLASSIC-CUF, Adult, 2 TB, Submin, Navy/White 23 - 33 cm	2357
NIBP, Cuff, Classic Cuff, Adult Long	CLASSIC-CUF, Adult Long, 2 TB, Submin, Navy/White 23 - 33 cm	2352
NIBP, Cuff, Classic Cuff, Lg Adult	CLASSIC-CUF, Large Adult, 2 TB, Submin, Rose/White 31 - 40 cm	2358
NIBP, Cuff, Classic Cuff, Lg Adult Long	CLASSIC-CUF, Large Adult Long, 2 TB, Submin, Rose/White 31 - 40 cm	2353
NIBP, Cuff, Classic Cuff, Thigh	CLASSIC-CUF, Thigh, 2 TB, Submin, Brown/White 38 - 50 cm	2359
NIBP, Cuff, Classic Cuff, Infant	CLASSIC-CUF, Infant, 2 TB, Screw, Orange/White 8 - 13 cm	2618
NIBP, Cuff, Classic Cuff, Child	CLASSIC-CUF, Child, 2 TB, Screw, Green/White 12 - 19 cm	2613
NIBP, Cuff, Classic Cuff, Sm Adult	CLASSIC-CUF, Small Adult, 2 TB, Screw, Lt. Blue/White 17 - 25 cm	2608
NIBP, Cuff, Classic Cuff, Adult	CLASSIC-CUF, Adult, 2 TB, Screw, Navy/White 23 - 33 cm	2603
NIBP, Cuff, Classic Cuff, Adult Long	CLASSIC-CUF, Adult Long, 2 TB, Screw, Navy/White 23 - 33 cm	2647
NIBP, Cuff, Classic Cuff, Lg Adult	CLASSIC-CUF, Large Adult, 2 TB, Screw, Rose/White 31 - 40 cm	2643
NIBP, Cuff, Classic Cuff, Lg Adult Long	CLASSIC-CUF, Large Adult Long, 2 TB, Screw, Rose/White 31 - 40 cm	2649
NIBP, Cuff, Classic Cuff, Thigh	CLASSIC-CUF, Thigh, 2 TB, Screw, Brown/White 38 - 50 cm	2648
NIBP, Cuff, Classic Cuff, Various	CLASSIC-CUF, Assortment, 2 TB, Submin: 1 Infant, 1 Child, Various limb circum: 2 Small Adult, 2 Adult, 1 Adult Long, 2 Large Adult, 1 Thigh	2292
NIBP, Cuff, Classic Cuff, Various	CLASSIC-CUF, Assortment, 2 TB, Screw: 1 Infant, 1 Child, Various limb circum: 2 Small Adult, 2 Adult, 1 Adult Long, 2 Large Adult, 1 Thigh	2692
NIBP, Cuff, Classic Cuff, Infant	CLASSIC-CUF, Infant, 2 TB, Submin, Yellow 8 - 13 cm	2670
NIBP, Cuff, Classic Cuff, Child	CLASSIC-CUF, Child, 2 TB, Submin, Yellow 12 - 19 cm	2671
NIBP, Cuff, Classic Cuff, Sm Adult	CLASSIC-CUF, Small Adult, 2 TB, Submin, Yellow 17 - 25 cm	2672
NIBP, Cuff, Classic Cuff, Adult	CLASSIC-CUF, Adult, 2 TB, Submin, Yellow 23 - 33 cm	2673
NIBP, Cuff, Classic Cuff, Lg Adult	CLASSIC-CUF, Large Adult, 2 TB, Submin, Yellow 31 - 40 cm	2674

Part	Part description	Part number
NIBP, Cuff, Classic Cuff, Thigh	CLASSIC-CUF, Thigh, 2 TB, Submin, Yellow 38 - 50 cm	2675
NIBP, Cuff, Classic Cuff, Infant	CLASSIC-CUF, Infant, 2 TB, Submin, Yellow 8 - 13 cm	2650
NIBP, Cuff, Classic Cuff, Child	CLASSIC-CUF, Child, 2 TB, Submin, Yellow 12 - 19 cm	2651
NIBP, Cuff, Classic Cuff, Sm Adult	CLASSIC-CUF, Small Adult, 2 TB, Submin, Yellow 17 - 25 cm	2607
NIBP, Cuff, Classic Cuff, Adult	CLASSIC-CUF, Adult, 2 TB, Submin, Yellow 23 - 33 cm	2602
NIBP, Cuff, Classic Cuff, Lg Adult	CLASSIC-CUF, Large Adult, 2 TB, Submin, Yellow 31 - 40 cm	2642
NIBP, Cuff, Classic Cuff, Thigh	CLASSIC-CUF, Thigh, 2 TB, Submin, Yellow 38 - 50 cm	2652
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal #1, 2 TB, Male Slip, White 3 - 6 cm	2638
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal #2, 2 TB, Male Slip, White 4 - 8 cm	2633
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal #3, 2 TB, Male Slip, White 6 - 11 cm	2628
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal #4, 2 TB, Male Slip, White 7 - 13 cm	2623
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal #5, 2 TB, Male Slip, White 8 - 15 cm	2619
NIBP, Cuff, Classic Cuff, Neonate	CLASSIC-CUF, Neonatal Assortment, 2 TB, Male Slip, White: Various limb circum: 2 Neonatal #1, 3 Neonatal #2, 5 Neonatal #3, 5 Neonatal #4, 5 Neonatal #5	2693
NIBP, Cuff, Sensa Cuff, Infant	SENSA-CUF, Infant, 2 TB, Mated Submin, Rust 8 - 13 cm	2430
NIBP, Cuff, Sensa Cuff, Child	SENSA-CUF, Child, 2 TB, Mated Submin, Green 12 - 19 cm	2431
NIBP, Cuff, Sensa Cuff, Sm Adult	SENSA-CUF, Small Adult, 2 TB, Mated Submin, Royal Blue 17 - 25 cm	2432
NIBP, Cuff, Sensa Cuff, Sm Adult Long	SENSA-CUF, Small Adult Long, 2 TB, Mated Submin, Royal Blue 17 - 25 cm	2433
NIBP, Cuff, Sensa Cuff, Adult	SENSA-CUF, Adult, 2 TB, Mated Submin, Navy 23 - 33 cm	2434
NIBP, Cuff, Sensa Cuff, Adult Long	SENSA-CUF, Adult Long, 2 TB, Mated Submin, Navy 23 - 33 cm	2435
NIBP, Cuff, Sensa Cuff, Lg Adult	SENSA-CUF, Large Adult, 2 TB, Mated Submin, Wine 31 - 40 cm	2436
NIBP, Cuff, Sensa Cuff, Lg Adult Long	SENSA-CUF, Large Adult Long, 2 TB, Mated Submin, Wine 31 - 40 cm	2437
NIBP, Cuff, Sensa Cuff, Thigh	SENSA-CUF, Thigh, 2 TB, Mated Submin, Brown 38 - 50 cm	2438
NIBP, Cuff, Sensa Cuff, Infant	SENSA-CUF, Infant, 2 TB, Submin, Rust 8 - 13 cm	2482
NIBP, Cuff, Sensa Cuff, Child	SENSA-CUF, Child, 2 TB, Submin, Green 12 - 19 cm	2484
NIBP, Cuff, Sensa Cuff, Sm Adult	SENSA-CUF, Small Adult, 2 TB, Submin, Royal Blue 17 - 25 cm	2486

Part	Part description	Part number
NIBP, Cuff, Sensa Cuff, Sm Adult Long	SENSA-CUF, Small Adult Long, 2 TB, Submin, Royal Blue 17 - 25 cm	2487
NIBP, Cuff, Sensa Cuff, Adult	SENSA-CUF, Adult, 2 TB, Submin, Navy 23 - 33 cm	2488
NIBP, Cuff, Sensa Cuff, Adult Long	SENSA-CUF, Adult Long, 2 TB, Submin, Navy 23 - 33 cm	2489
NIBP, Cuff, Sensa Cuff, Lg Adult	SENSA-CUF, Large Adult, 2 TB, Submin, Wine 31 - 40 cm	2490
NIBP, Cuff, Sensa Cuff, Lg Adult Long	SENSA-CUF, Large Adult Long, 2 TB, Submin, Wine 31 - 40 cm	2491
NIBP, Cuff, Sensa Cuff, Thigh	SENSA-CUF, Thigh, 2 TB, Submin, Brown 38 - 50 cm	2492
NIBP, Cuff, Sensa Cuff, Infant	SENSA-CUF, Infant, 2 TB, Screw, Rust 8 - 13 cm	2458
NIBP, Cuff, Sensa Cuff, Child	SENSA-CUF, Child, 2 TB, Screw, Green 12 - 19 cm	2460
NIBP, Cuff, Sensa Cuff, Sm Adult	SENSA-CUF, Small Adult, 2 TB, Screw, Royal Blue 17 - 25 cm	2462
NIBP, Cuff, Sensa Cuff, Sm Adult Long	SENSA-CUF, Small Adult Long, 2 TB, Screw, Royal Blue 17 - 25 cm	2463
NIBP, Cuff, Sensa Cuff, Adult	SENSA-CUF, Adult, 2 TB, Screw, Navy 23 - 33 cm	2464
NIBP, Cuff, Sensa Cuff, Adult Long	SENSA-CUF, Adult Long, 2 TB, Screw, Navy 23 - 33 cm	2465
NIBP, Cuff, Sensa Cuff, Lg Adult	SENSA-CUF, Large Adult, 2 TB, Screw, Wine 31 - 40 cm	2466
NIBP, Cuff, Sensa Cuff, Lg Adult Long	SENSA-CUF, Large Adult Long, 2 TB, Screw, Wine 31 - 40 cm	2467
NIBP, Cuff, Sensa Cuff, Thigh	SENSA-CUF, Thigh, 2 TB, Screw, Brown 38 - 50 cm	2468
NIBP, Cuff, Sensa Cuff, Various	SENSA-CUF, Assortment Pack: 2 TB, Screw, 1 sm Adult, 1 Adult, 1 Lg Adult	2494
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child, 2 TB, Mated Submin, Green 12 - 19 cm	2751
NIBP, Cuff, Dura Cuff, Sm Adult	DURA-CUF, Small Adult, 2 TB, Mated Submin, Royal Blue 17 - 25 cm	2752
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult, 2 TB, Mated Submin, Navy 23 - 33 cm	2753
NIBP, Cuff, Dura Cuff, Adult Long	DURA-CUF, Adult Long, 2 TB, Mated Submin, Navy 23 - 3 3cm	002756
NIBP, Cuff, Dura Cuff, Lg Adult	DURA-CUF, Large Adult, 2 TB, Mated Submin, Wine 31 - 40 cm	2754
NIBP, Cuff, Dura Cuff, Lg Adult Long	DURA-CUF, Large Adult Long, 2 TB, Mated Submin, Wine 31 - 40 cm	002757
NIBP, Cuff, Dura Cuff, Thigh	DURA-CUF, Thigh, 2 TB, Mated Submin, Brown 38 - 50 cm	2755
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child, 2 TB, Mated Submin, Green 12 - 19 cm	2751E
NIBP, Cuff, Dura Cuff, Sm Adult	DURA-CUF, Small Adult, 2 TB, Mated Submin, Royal Blue 17 - 25 cm	2752E

Part	Part description	Part number
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult, 2 TB, Mated Submin, Navy 23 - 33 cm	2753E
NIBP, Cuff, Dura Cuff, Adult Long	DURA-CUF, Adult Long, 2 TB, Mated Submin, Navy 23 - 33 cm	002756E
NIBP, Cuff, Dura Cuff, Lg Adult	DURA-CUF, Large Adult, 2 TB, Mated Submin, Wine 31 - 40 cm	2754E
NIBP, Cuff, Dura Cuff, Lg Adult Long	DURA-CUF, Large Adult Long, 2 TB, Mated Submin, Wine 31 - 40 cm	002757E
NIBP, Cuff, Dura Cuff, Thigh	DURA-CUF, Thigh, 2 TB, Mated Submin, Brown 38 - 50 cm	2755E
NIBP, Cuff, Dura Cuff, Infant	DURA-CUF, Infant, 2 TB, Submin, Rust 8 - 13 cm	002200
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child, 2 TB, Submin, Green 12 - 19 cm	002201
NIBP, Cuff, Dura Cuff, Sm Adult	DURA-CUF, Small Adult, 2 TB, Submin, Royal Blue 17 - 25 cm	002202
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult, 2 TB, Submin, Navy 23 - 33 cm	002203
NIBP, Cuff, Dura Cuff, Adult Long	DURA-CUF, Adult Long, 2 TB, Submin, Navy 23 - 33 cm	002206
NIBP, Cuff, Dura Cuff, Lg Adult	DURA-CUF, Large Adult, 2 TB, Submin, Wine 31 - 40 cm	002204
NIBP, Cuff, Dura Cuff, Lg Adult Long	DURA-CUF, Large Adult Long, 2 TB, Submin, Wine 31 - 40 cm	002207
NIBP, Cuff, Dura Cuff, Thigh	DURA-CUF, Thigh, 2 TB, Submin, Brown 38 - 50 cm	002205
NIBP, Cuff, Dura Cuff, Infant	DURA-CUF, Infant, 2 TB, Screw, Rust 8 - 13 cm	002783
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child, 2 TB, Screw, Green 12 - 19 cm	002781
NIBP, Cuff, Dura Cuff, Child Long	DURA-CUF, Child Long, 2 TB, Screw, Green 12 - 19 cm	2785
NIBP, Cuff, Dura Cuff, Sm Adult	DURA-CUF, Small Adult, 2 TB, Screw, Royal Blue 17 - 25 cm	002779
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult with Hanger, 2 TB, Screw, Navy 23 - 33 cm	002771
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult, 2 TB, Screw, Navy 23 - 33 cm	002774
NIBP, Cuff, Dura Cuff, Adult Long	DURA-CUF, Adult Long, 2 TB, Screw, Navy 23 - 33 cm	002772
NIBP, Cuff, Dura Cuff, Lg Adult	DURA-CUF, Large Adult, 2 TB, Screw, Wine 31 - 40 cm	002791
NIBP, Cuff, Dura Cuff, Lg Adult Long	DURA-CUF, Large Adult Long, 2 TB, Screw, Wine 31 - 40 cm	002784
NIBP, Cuff, Dura Cuff, Thigh	DURA-CUF, Thigh, 2 TB, Screw, Brown 38 - 50 cm	002796
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child Assortment, 2 TB, Submin: 2 Infant, 3 Child, 1 Small Adult, Various limb circum	2296
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult Assortment, 2 TB, Submin: 1 Small Adult, 2 Adult, 1 Adult Long, 1 Large Adult, 1 Large Adult Long, Various limb circum	2297

Part	Part description	Part number
NIBP, Cuff, Dura Cuff, Various	DURA-CUF, Assortment, 2 TB, Submin: 1 Infant, 1 Child, 1 Small Adult, 1 Adult, 1 Large Adult, 1 Thigh, Various limb circum	2299
NIBP, Cuff, Dura Cuff, Various	DURA-CUF, Assortment, 2 TB, Screw: 1 Infant, 1 Child, 1 Small Adult, 1 Adult, 1 Large Adult, 1 Thigh, Various limb circum	002699
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child Assortment, 2 TB, Screw: 2 Infant, 3 Child, 1 Small Adult, Various limb circum	002697
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult Assortment, 2 TB, Screw: 1 Small Adult, 2 Adult, 1 Adult Long, 1 Large Adult, 1 Large Adult Long, Various limb circum	002698
NIBP, Cuff, Dura Cuff, Infant	DURA-CUF, Infant, 2 TB, Submin, Rust 8 - 13 cm	002200E
NIBP, Cuff, Dura Cuff, Child	DURA-CUF, Child, 2 TB, Submin, Green 12 - 19 cm	002201E
NIBP, Cuff, Dura Cuff, Sm Adult	DURA-CUF, Small Adult, 2 TB, Submin, Royal Blue 17 - 25 cm	002202E
NIBP, Cuff, Dura Cuff, Adult	DURA-CUF, Adult, 2 TB, Submin, Navy 23 - 33 cm	002203E
NIBP, Cuff, Dura Cuff, Adult Long	DURA-CUF, Adult Long, 2 TB, Submin, Navy 23 - 33 cm	002206E
NIBP, Cuff, Dura Cuff, Lg Adult	DURA-CUF, Large Adult, 2 TB, Submin, Wine 31 - 40 cm	002204E
NIBP, Cuff, Dura Cuff, Lg Adult Long	DURA-CUF, Large Adult Long, 2 TB, Submin, Wine 31 - 40 cm	002207E
NIBP, Cuff, Dura Cuff, Thigh	DURA-CUF, Thigh, 2 TB, Submin, Brown 38 - 50 cm	002205E
NIBP, Adult, 1 2ft	Air hose adult/ped 12 ft, gray	107365
NIBP, Neonate, 12 ft	Air hose, neonatal 12 ft, light blue	107368
NIBP, Adult, 24 ft	Air hose adult/ped 24 ft, gray	107366
NIBP, Cuff hose caps	Cuff hose caps (washing plugs), 50/pk	300877
NIBP, Cuff hose caps, Subminiature	Cuff hose caps (washing plugs), subminiature, 50/pk	330072

SpO_2 - Ohmeda accessories

Part	Part description	Part number
SpO_2 - Cable Assy	TruSignal Interconnect cable with GE connector	TS-G3
SpO_2 - Sensor	TruSignal Finger Sensor with integrated cable, 2 m	TS-F2-GE
SpO_2 - Sensor	TruSignal Finger Sensor with integrated cable, 4 m	TS-F4-GE
SpO_2 - Sensor	TruSignal Finger Sensor	TS-F-D
SpO_2 - Sensor	TruSignal Soft Adult Sensor with integrated cable and D connector, 1 m	TS-SA-D
SpO_2 - Sensor	TruSignal Soft Adult Sensor with integrated cable and GE connector, 4 m	TS-SA4-GE
SpO_2 - Sensor	TruSignal Wrap Sensor	TS-W-D
SpO_2 - Sensor	TruSignal Ear Sensor with integrated cable, 4 m	TS-E4-GE
SpO_2 - Sensor	TruSignal Ear Sensor with integrated cable, 2 m	TS-E2-GE
SpO_2 - Sensor	TruSignal Ear Sensor	TS-E-D
SpO_2 - Sensor	TruSignal Sensitive Skin Sensor	TS-SE-3
SpO_2 - Sensor	TruSignal AllFit Sensor, 10/box	TS-AF-10
SpO_2 - Sensor	TruSignal AllFit Sensor, 25/box	TS-AF-25
SpO_2 - Accessory	Wide replacement tape, adhesive	OXY-RTW
SpO_2 - Accessory	Foam wrap replacement, large, weight range $\geq$ 3 kg	OXY-RWL
SpO_2 - Accessory	Foam wrap replacement, medium, weight range $\geq$ 3 kg	OXY-RWM
SpO_2 - Accessory	Foam wrap replacement, small, weight range < 3 kg	OXY-RWS
SpO_2 - Accessory	Replacement tape, AllFit Sensor, Bears - 100/box	OXY-RTB
SpO_2 - Accessory	Replacement tape, AllFit Sensor, Blue - 100/box	OXY-RT
SpO_2 - Accessory	Infant Foam Sandal, use with OxyTip++ Sensitive Skin sensor - 3/box	OXY-SND

SpO_2 - Nellcor accessories

Part	Part description	Part number
SpO_2 Cable Assy 3 m	Cable Assy SpO_2 Nellcor OxiMax 3 m - Smart	2021406-001
SpO_2 Cable Assy 3 m	Cable Assy SpO_2 Nellcor OxiMax 1.2 m - Smart	2021406-002
SpO_2 - Sensor	Max -A Adult Finger Adhesive Sensor - 24/box	70124027
SpO_2 - Sensor	Max -AL Adult Long Finger Adhesive Sensor - 24/box	2028117-001
SpO_2 - Sensor	Max-P Pediatric Finger Adhesive Sensor - 24/box	70124022
SpO_2 - Sensor	Max-N Neonate Foot Adhesive Sensor - 24/box	70124032
SpO_2 - Sensor	Max-I Infant, Adhesive, Sensor - 24/box	70124026
SpO_2 - Sensor	Max-R, Adhesive, Nasal - 24/box	407705-005
SpO_2 - Sensor	OXIBAND (OXI-P/I) Pediatric/Infant Sensor	414248-001
SpO_2 - Sensor	OXIBAND (OXI-A/N) Adult/Neonate Sensor	414248-002
SpO_2 - Sensor	OXIBAND (OXI-A/N) Adult/Neonate Sensor	70124035 (EMEA)
SpO_2 - Sensor	Nellcor Multisite Sensor D-YS Reusable	70124033
SpO_2 - Sensor	Nellcor DuraSensor DS-100A	70124021
SpO_2 - Sensor	Nellcor DuraSensor DS-100A	407705-006 (US)
SpO_2 - Accessory	Nellcor Ear-Clip D-YSE Sensor for 70124033	70124034
SpO_2 - Accessory	Nellcor Tape ADH-A/N, use with 70124035	2016130-001
SpO_2 - Accessory	Nellcor Tape ADH-P/I, use with Oxi-P/I Sensors	2016131-001

SpO_2 - Masimo accessories

Part	Part description	Part number
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor, LNOP Adt. Adult - 20/box	2010458-001
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor, LNOP Pdt. Pediatric - 20/box	2010459-001
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor, LNOP NeoPT. Neonatal - 20/box	2010461-001
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor Bridge, LNOP Neo. Neonatal - 20/box	2010460-001

Part	Part description	Part number
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor, LNOP-Neo-L. Neonatal - 20/box	2017089-001
SpO_2 - Sensor	Masimo LNOP Disposable Adhesive Sensor, LNOP NeoPT-L. Neonatal - 20/box	2017090-001
SpO_2 - Sensor	Masimo LNOP Adtx Disposable Adhesive Sensor Transparent Tape LNOP, Adult - 20/box	2027269-001
SpO_2 - Sensor	Masimo LNOP Pdtx Disposable Adhesive Sensor Transparent Tape LNOP, Pediatric - 20/box	2027270-001
SpO_2 - Sensor	Masimo LNOP Disposable LNOP Disposable LNOP Hi Fi Sensor Neonatal/Adult - 20/box	2027272-001
SpO_2 - Sensor	Masimo LNOP Disposable LNOP Disposable LNOP Hi Fi Sensor Infant/Pediatric - 20/box	2027271-001
SpO_2 - Sensor	Masimo LNOP Disposable LNOP Disposable LNOP Blue Infant Thumb/Toe Sensor - 20/box	2027273-001
SpO_2 - Sensor	Masimo LNOP Reusable Finger Sensor LNOP/DCIP Pediatric	2002799-001
SpO_2 - Sensor	Masimo LNOP Reusable Finger Sensor LNOP/DCI Adult, LNOP/DCI	2002800-001
SpO_2 - Sensor	Masimo LNOP Reusable Multisite Sensor LNOP-YI	2010463-001
SpO_2 - Sensor	Masimo LNOP Reusable Tip-Clip Ear Sensor LKNOP TC-I	2027274-001
SpO_2 - Sensor	Masimo LNOP Reusable Finger Sensor Adult DC-195	2009745-001
SpO_2 - Sensor	Masimo LNCS DCI Reusable Adult Sensor	2027258-001
SpO_2 - Sensor	Masimo LNCS DCIP Reusable Pediatric Sensor	2027259-001
SpO_2 - Sensor	Masimo LNCS TC-I TipClip Reusable Ear Sensor	2027261-001
SpO_2 - Sensor	Masimo LNCS Adult, Transparent Adhesive Sensor - 20/box	2027253-001
SpO_2 - Sensor	Masimo LNCS Pdtx Pediatric Adhesive Sensor - 20/box	2027254-001
SpO_2 - Sensor	Masimo LNCS Inf-L Infant Adhesive Sensor - 20/box	2027255-001
SpO_2 - Sensor	Masimo LNCS Neo-L Neonatal Adhesive Sensor - 20/box	2027256-001
SpO_2 - Sensor	Masimo LNCS NeoPt-L Neonatal PT Adhesive Sensor - 20/box	2027257-001
SpO_2 - Cable Assy - 2.4 m	Masimo LNOP, SpO_2 2.4 m	2017002-003
SpO_2 - Cable Assy - 3.6 m	Masimo LNOP, SpO_2 3.6 m	2017002-001
SpO_2 - Cable Assy - 3 m	Masimo LNC-10, SpO_2 3 m	2027263-002
SpO_2 - Accessory	Masimo Replacement Posey Wrap, LNOP-NeoPt-L, Neonatal - 12/box	2010466-001

Part	Part description	Part number
SpO_2 - Accessory	Masimo Tape Bag for LNOP-NEO - 100/box	2010467-001
SpO_2 - Accessory	Masimo Tape Cleanshield Multisite, LNOP-YI - 100/box	2010468-001
SpO_2 - Accessory	Masimo Disposable Standard Multisite Wrap, Adult/Ped/ Neonatal Adhesive Attachment Wraps, use with LNOP-YI Multisite Reusable Sensor - 100/box	2010469-001
SpO_2 - Accessory	Masimo Tape Standard Petite Wrap, LNOP-YI - 100/box	2010470-001
SpO_2 - Accessory	Masimo Adhesive Tape for LNOP-YI - 12/box	2010471-001

Temperature accessories - Alaris

Part	Part description	Part number
Alaris Temperature, Oral Probe	Sensor Turbo Temp Temperature, Long, White Cord (Blue)	2008774-001
Alaris Temperature, Rectal Probe	Sensor Turbo Temp Temperature, Long Rectal, White Cord (Red)	2008775-001
Alaris Temperature, Oral Probe	Sensor Tri-Site Temperature, Long, White Cord (Blue)	2041178-001
Alaris Temperature, Rectal Probe	Sensor Tri-Site Temperature, Long Rectal, White Cord (Red)	2041179-001
Alaris Probe Covers	Probe covers - case	088015

Temperature accessories - Exergen

Part	Part description	Part number
Exergen Temporal Scanner, Fahrenheit - arterial	Exergen TAT-5000 temporal scanner with cable interface to the V100, reporting in °F calibrated to arterial reference	2044860-001
Exergen Temporal Scanner, Celsius - arterial	Exergen TAT-5000 temporal scanner with cable interface to the V100, reporting in °C calibrated to arterial reference	2044860-002
Exergen Temporal Scanner, Celsius - oral	Exergen TAT-5000 temporal scanner with cable interface to the V100, reporting in °C calibrated to an oral reference	2044860-003
Exergen Temporal Scanner, Fahrenheit - oral	Exergen TAT-5000 temporal scanner with cable interface to the V100, reporting in °F calibrated to an oral reference	2044860-004
Exergen Scanner Disposable Caps	Protective covers - rigid plastic covers probe cone, 1000/ box	EX134203
Exergen Scanner Disposable Caps	Protective covers - rigid plastic covers probe cone, 5000/ box	EX134205
Exergen Scanner Disposable Sheath	Disposable tubular protective sheath, 250/box	EX129462

Part	Part description	Part number
Cable - Exergen	Cable, Exergen TAT-5000 to V100 interface	2044860-005
Calibration - Exergen, Fahrenheit - arterial	Exergen calibration verification kit for °F calibrated to an arterial reference	EX129003
Exergen Scanner Holder	Exergen TAT-5000 holder and installation instructions	2051186-001

Power accessories

Part	Part description	Part number
Battery - CARESCAPE V100 vital signs monitor	FRU CARESCAPE V100 vital signs monitor battery (X1 Batt)	2037103-016
12W Power Supply	Power supply, Input 100-240VAC 50/60 Hz 0.5A; Output 12VDC 1.0A	2018859-001
12W Power Supply (Japan)	Power supply, Input 100-240VAC 50/60 Hz 0.5A; Output 12VDC 1.0A	2018859-004
Power Cord (Japan)	Power supply cord, Japan ST-ST PSE 10A 250V 12 FT	405535-014
Power Cord (US)	Power supply cord, hospital grade 10A 125V 12FT	405535-002
Power Cord (Brazil)	Power supply cord, Brazil ST- ST 10A 250V 2.5M.	401855-041
Power Cord (continental Europe and Korea)	Power supply cord, continental Europe 10A 250V 2.5M	401855-101
Power Cord (UK)	Power supply cord, British 10A 250V 2.5M	401855-102
Power Cord (Italy)	Power supply cord, Italian 10A 250V 2.5M	401855-103
Power Cord (Australia)	Power supply cord, Australian 10A 250V 2.5M	401855-110
Power Cord (India)	Power supply cord, Indian 10A 250V 2.5M	401855-108

Printer accessories

Part	Part description	Part number
Replacement Paper	Printer paper roll - 10/box	089100

Mounting accessories

Part	Part description	Part number
Roll Stand	Rollstand, CARESCAPE, GCX Version	2033297-001
Pole Mount	Pole Mount	2009762-001
Power Supply Mounting Bracket	12W Power supply roll stand bracket	2047870-001
Wall Mount Bracket	GCX wall mount bracket for DP100 - 400 monitors	CR-0008-01
IR adapter cable roll mount bracket	IR adapter cable roll mount bracket	2025344-001

Connectivity accessories

Part	Part description	Part number
ILC1931	DINALINK ApexPro Adapter	001931
ILC1926	Isolated Line Converter	001926
ILC1932	DINALINK ApexPro FH adapter	001932
Cable Assy, use with 001932	Cable assembly to use with 001932	394119-008
Cable Assy, use with 001931	Cable assembly telemetry interface DINALINK	418497-002
Cable Assy, use with 001926, 001931, 001932	Cable assembly, DINAMAP to ILC	683235
Cable Assy	Cable assembly, ILC to PC	683242
Cable Kit, USB	USB cable kit, DINAMAP to PC	2040229-001
Patient ID	Patient ID IR Cable (used with IR adapter kit)	2024500-001
Patient ID Kit	IR adapter kit with bracket	2026273-002
Remote Alarm	Remote Alarm Cable	487208CR

Field-replaceable units (FRUs)

NOTE

GE supports troubleshooting and repair to the FRU-level only. GE does not make available schematics, assembly drawings, or bills of material beyond what is provided in this manual. Attempting repair on a PCB or factory-sealed component is not recommended.

FRU list

The following table offers details of each of the corresponding bubble numbers that appear on the exploded engineering-assembly drawing (drawing is located after this table). Photos of each FRU follow.

NOTE

FRU numbers are subject to change.

Bubble Number	Part Number	Description
2	2037103-002	FRU CARESCAPE Plastic Kit No PRTR
3	2037103-003	FRU CARESCAPE Plastic Kit W/ PRTR
4	2037103-004	FRU CARESCAPE V100 TEMPERATURE KIT
5	2037103-005	FRU CARESCAPE V100 Printer Assembly
6[a]	2037103-006	FRU CARESCAPE V100 BZL, (BP ONLY)
7	2037103-007	FRU CARESCAPE V100 Inner chassis kit
8	2037103-008	FRU CARESCAPE V100 PRTR DOORX1/ROLLERS X5
10[b, h]	2037103-083	FRU CARESCAPE V100 V1.5 Main Board
10[b, j]	2037103-087	FRU CARESCAPE V100 V1.5 Main Board MS-2011
12[c]	2037103-012	FRU CARESCAPE V100 UI Board
13	2037103-013	FRU CARESCAPE V100 SpO_2 NELLCOR
15[d]	2037103-015	FRU CARESCAPE V100 Pneumatic Kit
16[e]	2037103-016	FRU CARESCAPE V100 BATTERY (X1 BATT)
17	2037103-017	FRU CARESCAPE V100 Speaker
18	2037103-018	FRU CARESCAPE V100 Cable kit
19[f]	2037103-062	FRU CARESCAPE V100 Fascia Kit - English
19[f]	2037103-063	FRU CARESCAPE V100 Fascia Kit - German
19[f]	2037103-064	FRU CARESCAPE V100 Fascia Kit - Czech
19[f]	2037103-065	FRU CARESCAPE V100 Fascia Kit - Danish

Bubble Number	Part Number	Description
19[f]	2037103-066	FRU CARESCAPE V100 Fascia Kit - Dutch
19[f]	2037103-067	FRU CARESCAPE V100 Fascia Kit - Finnish
19[f]	2037103-068	FRU CARESCAPE V100 Fascia Kit - French
19[f]	2037103-069	FRU CARESCAPE V100 Fascia Kit - Greek
19[f]	2037103-070	FRU CARESCAPE V100 Fascia Kit - Hungarian
19[f]	2037103-071	FRU CARESCAPE V100 Fascia Kit - Italian
19[f]	2037103-072	FRU CARESCAPE V100 Fascia Kit - Japanese
19[f]	2037103-073	FRU CARESCAPE V100 Fascia Kit - Korean
19[f]	2037103-074	FRU CARESCAPE V100 Fascia Kit - Norwegian
19[f]	2037103-075	FRU CARESCAPE V100 Fascia Kit - Polish
19[f]	2037103-076	FRU CARESCAPE V100 Fascia Kit - Portuguese
19[f]	2037103-077	FRU CARESCAPE V100 Fascia Kit - Russian
19[f]	2037103-078	FRU CARESCAPE V100 Fascia Kit - Slovak
19[f]	2037103-079	FRU CARESCAPE V100 Fascia Kit - Spanish
19[f]	2037103-080	FRU CARESCAPE V100 Fascia Kit - Swedish
19[f]	2037103-081	FRU CARESCAPE V100 Fascia Kit - Lithuanian
19[f]	2037103-082	FRU CARESCAPE V100 Fascia Kit - Turkish
22	2037103-022	FRU CARESCAPE V100 ALL HARDWARE KIT
23[h]	2037103-023	FRU CARESCAPE V100 SpO_2 MASIMO
23[j]	2037103-084	FRU CARESCAPE V100 SpO_2 MASIMO MS-2011
24	2037103-024	FRU CARESCAPE V100 SpO_2 OHMEDA
44[g]	2037103-044	FRU CARESCAPE V100 Keypad Kit
52[a]	2037103-052	FRU CARESCAPE V100 BZL, (BP & TEMP)
53[a, h]	2037103-053	FRU CARESCAPE V100 BZL, (BP & SpO_2)
53[a, j]	2037103-085	FRU CARESCAPE V100 BZL, (BP & SpO_2) MS-2011
54[a, h]	2037103-054	FRU CARESCAPE V100 BZL, (BP & SpO_2 & TEMP)

Bubble Number	Part Number	Description
54[a, j]	2037103-086	FRU CARESCAPE V100 BZL, (BP & SpO_2 & TEMP) MS-2011

[a] All SpO_2 technology labels included. Select applicable label per monitor configuration.

[b] Main boards configured with SuperSTAT NIBP algorithm, Nellcor SpO_2, and Temperature enabled. Reconfigure as applicable per monitor configuration. Refer to *"Installation"* Chapter 3 for more details.

[c] All UI board LEDs installed. Cover LEDs with applicable fascia per monitor configuration.

[d] Check valve has directional arrow indicating correct orientation for assembly.

[e] Fully charge battery before initial use. Refer to *"Installation"* Chapter 3 for more details.

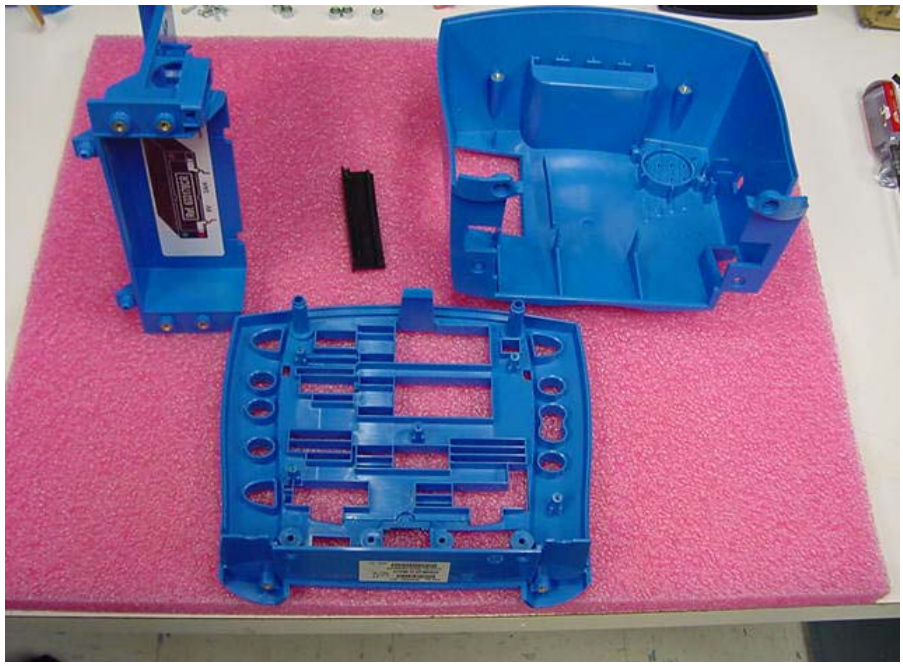
[f] Kit includes all versions of fascia and display covers. Install per monitor configuration.

[g] Remove **Print** button for non-printer versions of monitor. Refer to following assembly drawings.

[h] This part number is compatible with product code **SDT** only. Refer to "Equipment ID" on page 1-13 to determine product code.

[j] This part number is compatible with product code **SH6** only. Refer to "Equipment ID" on page 1-13 to determine product code.

FRU photos



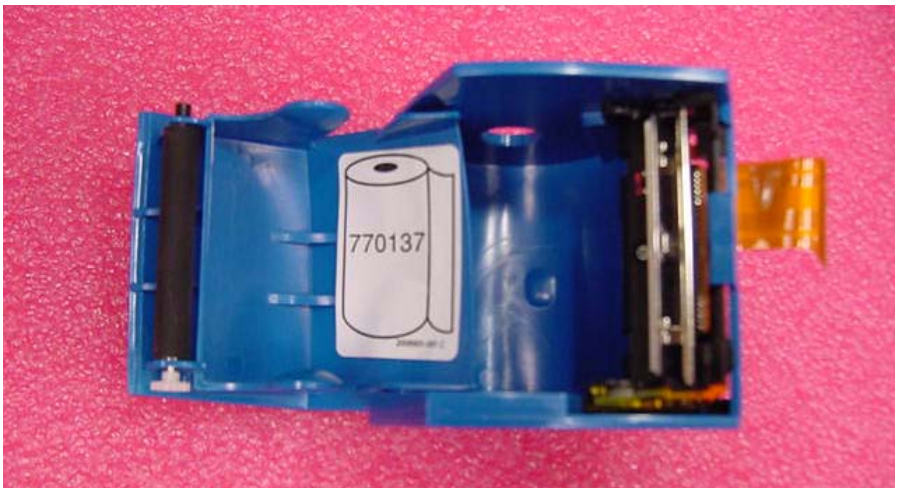
FRU 2037103-002: CARESCAPE plastic kit no printer

FRU 2037103-003: CARESCAPE plastic kit w/ printer

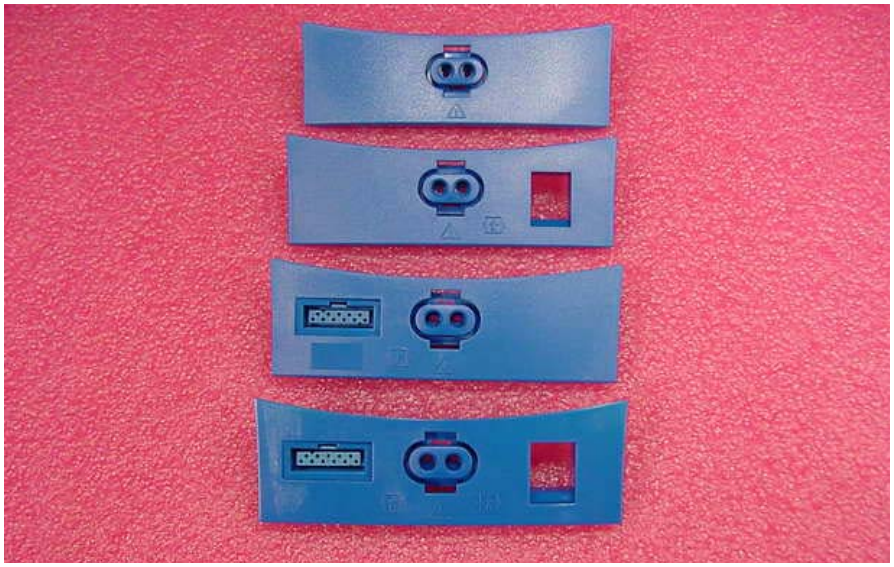
NOTE

Rear case with printer shown.

FRU 2037103-004: CARESCAPE V100 temperature kit (Alaris)



FRU 2037103-005: CARESCAPE V100 printer assembly



FRU 2037103-006: CARESCAPE V100 BZL, (BP only)

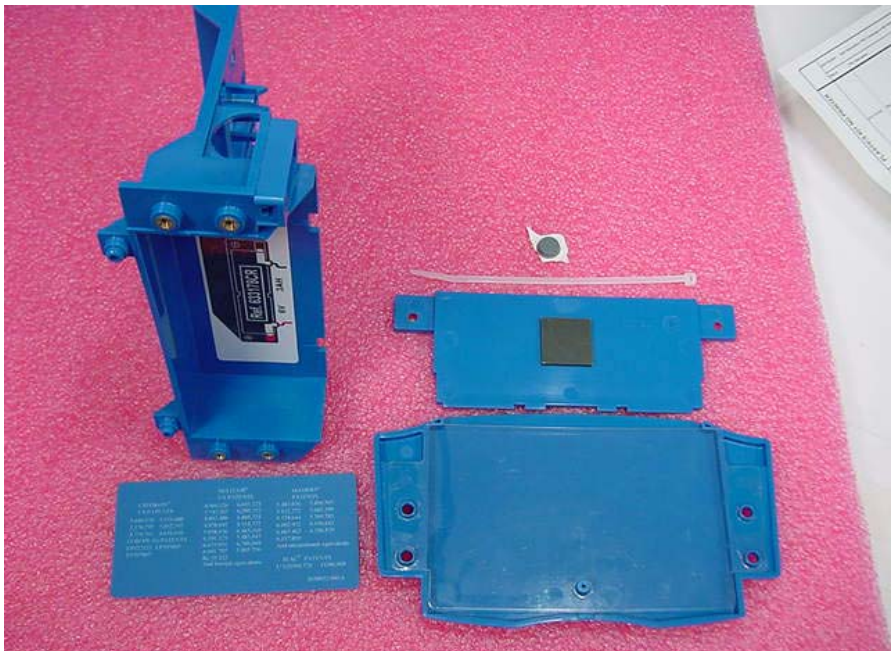
FRU 2037103-052: CARESCAPE V100 BZL, (BP & Temp)

FRU 2037103-053: CARESCAPE V100 BZL, (BP & SpO_2)

FRU 2037103-054: CARESCAPE V100 BZL, (BP & SpO_2 & Temp)

NOTE

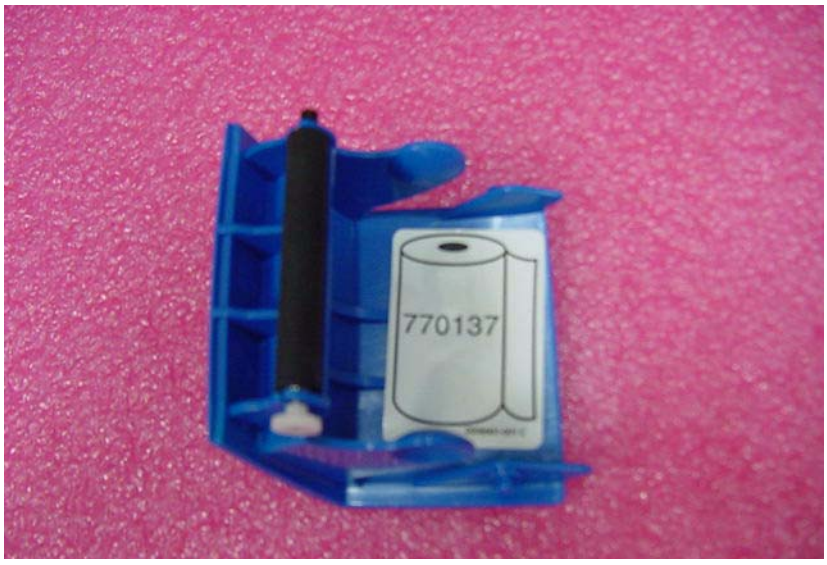
Kit includes only 1 bezel.



FRU 2037103-007: CARESCAPE V100 inner chassis kit

NOTE

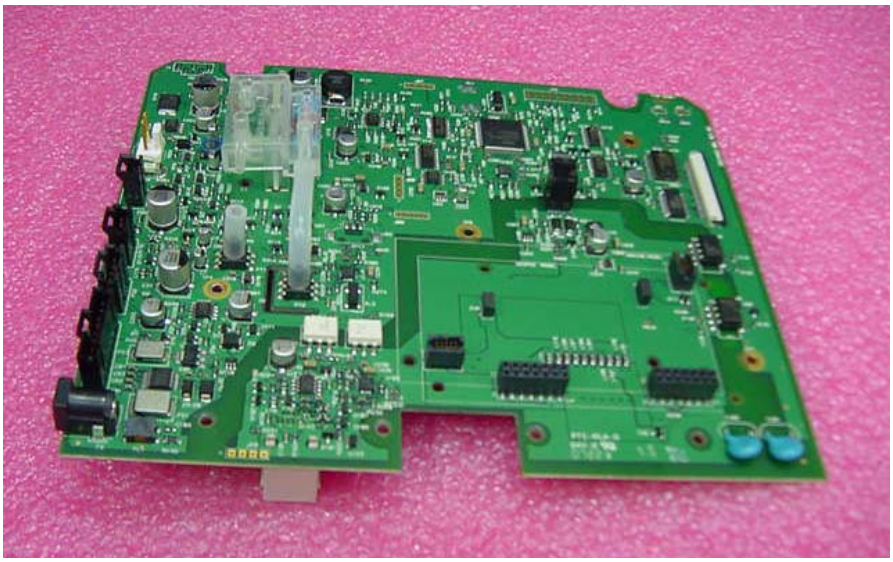
Kit includes 4 adhesive-backed feet.



FRU 2037103-008: CARESCAPE V100 Prtr door X1/rollers X5

NOTE

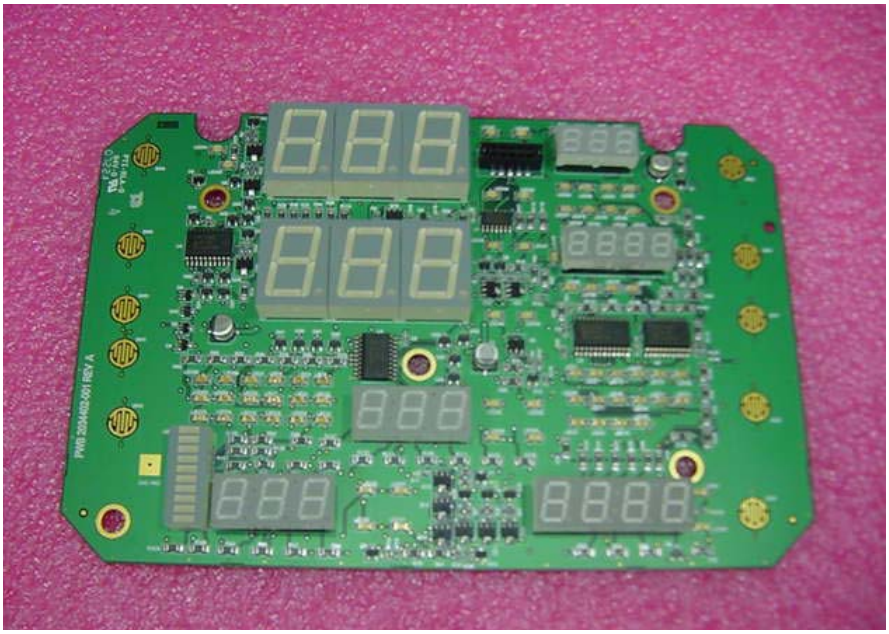
Kit includes 1 printer door with label and 5 printer rollers.



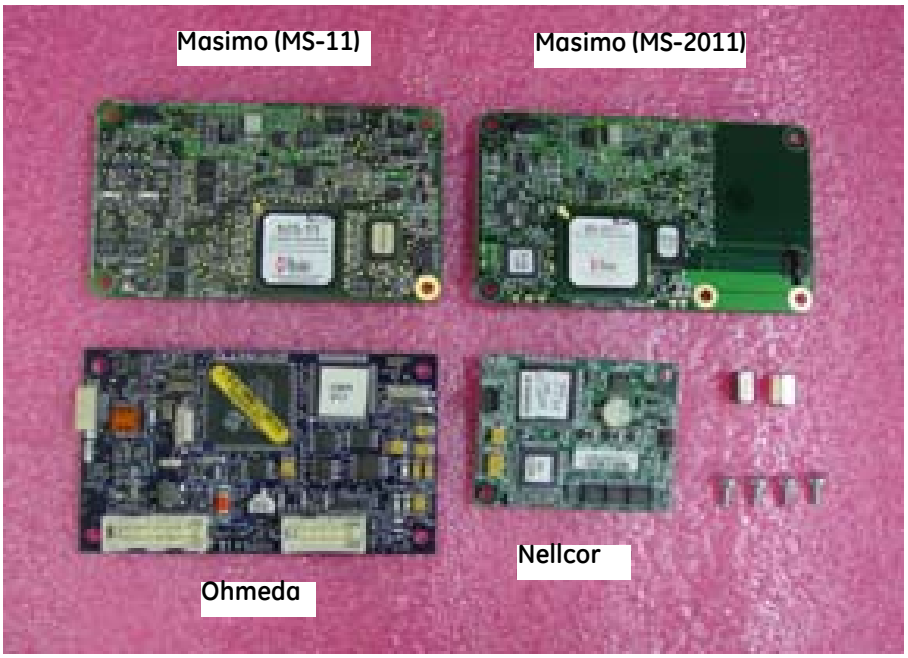
FRU 2037103-083: CARESCAPE V100 V1.5 main board

NOTE

- Each main board comes with all parameters installed. For monitors that do not include specific options (Printer, SpO_2, Temperature), these options must be turned off while the monitor is in configuration mode.
- Each main board comes configured with the SuperSTAT NIBP algorithm. If your monitor was originally configured with the Auscultatory or Classic NIBP Algorithm, the algorithm must be changed while the monitor is in configuration mode.



FRU 2037103-012: CARESCAPE V100 UI board



FRU 2037103-013: CARESCAPE V100 SpO_2 Nellcor

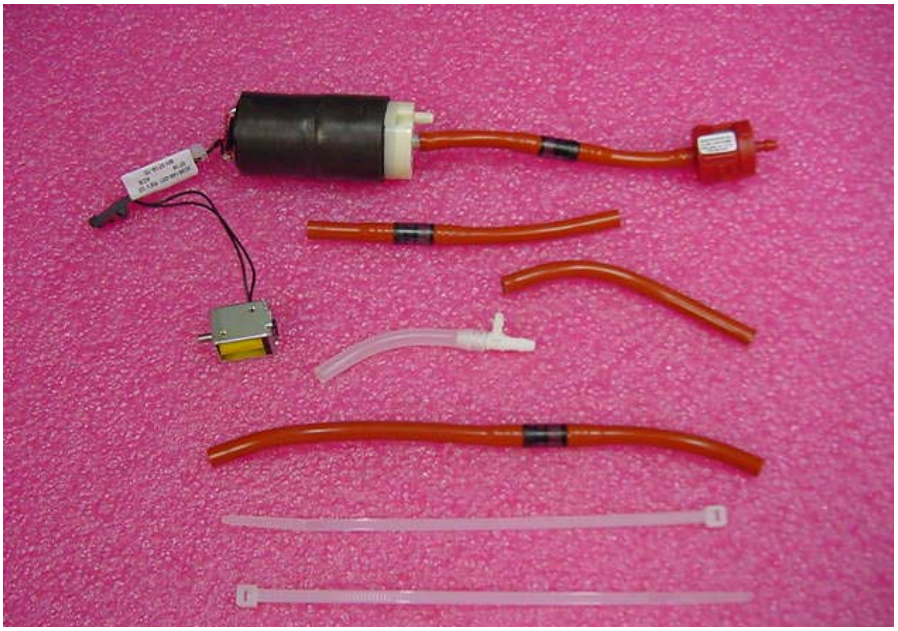
FRU 2037103-023: CARESCAPE V100 SpO2 Masimo

or FRU 2037103-084 CARESCAPE V100 SpO2 Masimo MS-2011

FRU 2037103-024: CARESCAPE V100 SpO_2 Ohmeda

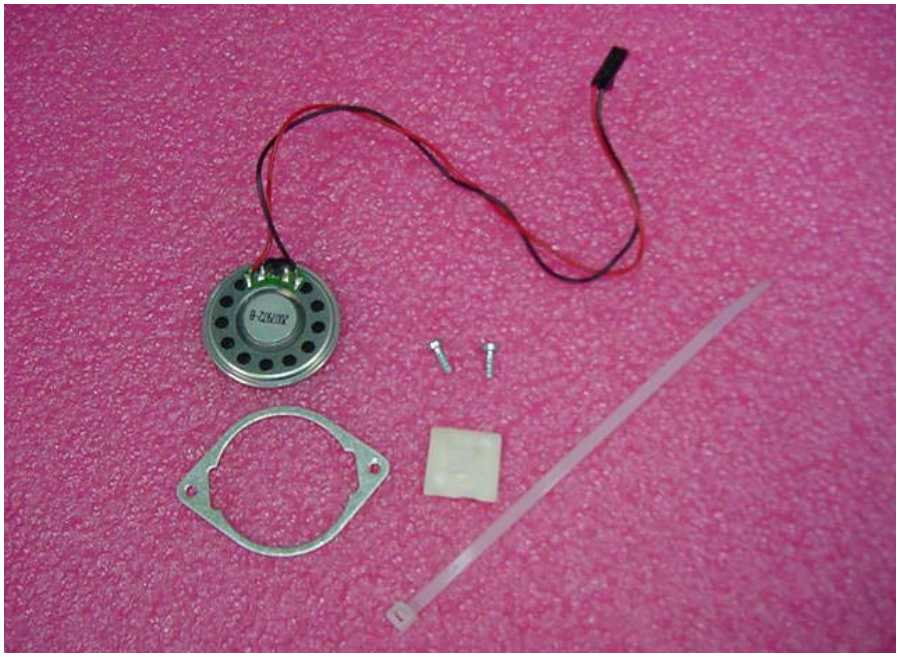
NOTE

- All 4 SpO_2 boards shown. Kit includes only one.
- Nellcor hardware shown. Kit includes matching hardware.

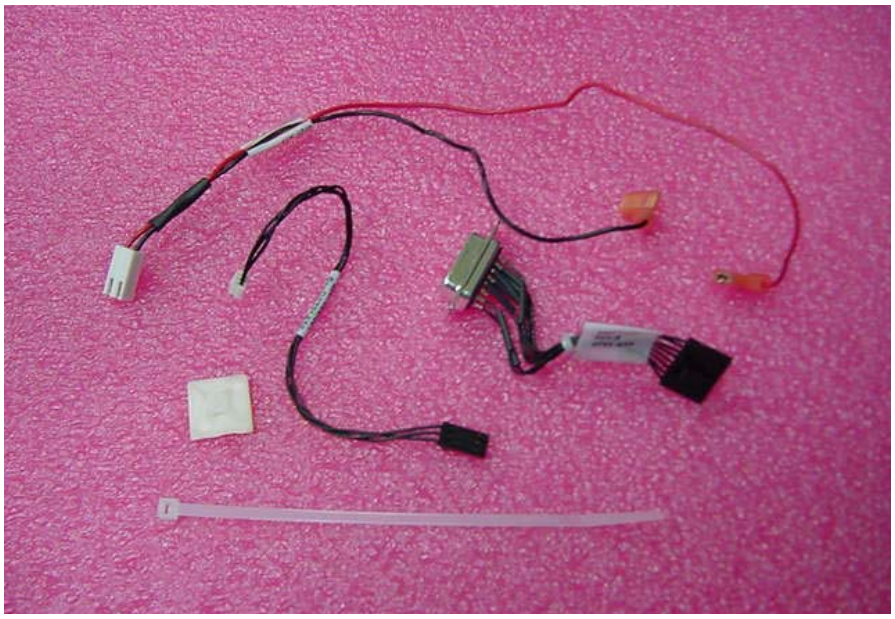


FRU 2037103-015: CARESCAPE V100 pneumatic kit

FRU 2037103-016: CARESCAPE V100 main battery (X1 BATT)



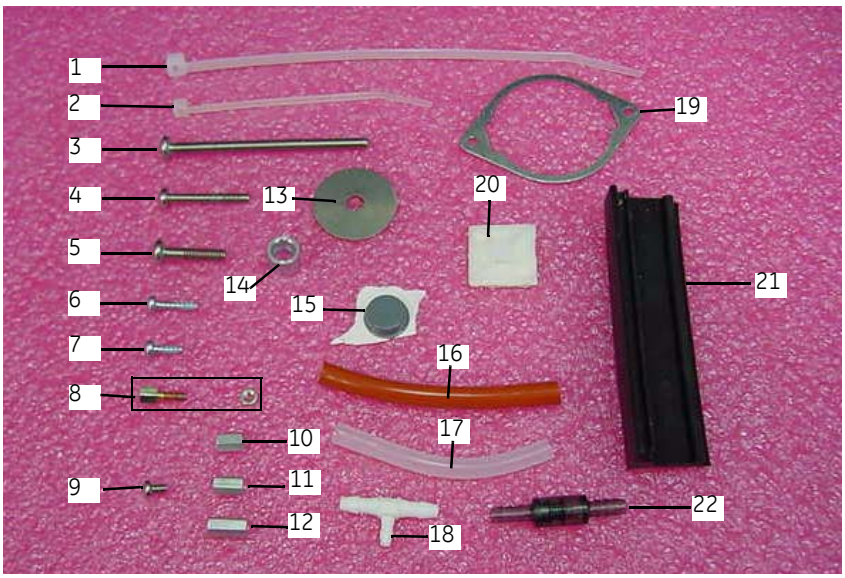
FRU 2037103-017: CARESCAPE V100 speaker



FRU 2037103-018: CARESCAPE V100 cable kit

FRU number	Description	Language
FRU 2037103-062	CARESCAPE V100 Fascia Kit	English
FRU 2037103-063	CARESCAPE V100 Fascia Kit	German
FRU 2037103-064	CARESCAPE V100 Fascia Kit	Czech
FRU 2037103-065	CARESCAPE V100 Fascia Kit	Danish

FRU number	Description	Language
FRU 2037103-066	CARESCAPE V100 Fascia Kit	Dutch
FRU 2037103-067	CARESCAPE V100 Fascia Kit	Finnish
FRU 2037103-068	CARESCAPE V100 Fascia Kit	French
FRU 2037103-069	CARESCAPE V100 Fascia Kit	Greek
FRU 2037103-070	CARESCAPE V100 Fascia Kit	Hungarian
FRU 2037103-071	CARESCAPE V100 Fascia Kit	Italian
FRU 2037103-072	CARESCAPE V100 Fascia Kit	Japanese
FRU 2037103-073	CARESCAPE V100 Fascia Kit	Korean
FRU 2037103-074	CARESCAPE V100 Fascia Kit	Norwegian
FRU 2037103-075	CARESCAPE V100 Fascia Kit	Polish
FRU 2037103-076	CARESCAPE V100 Fascia Kit	Portuguese
FRU 2037103-077	CARESCAPE V100 Fascia Kit	Russian
FRU 2037103-078	CARESCAPE V100 Fascia Kit	Slovak
FRU 2037103-079	CARESCAPE V100 Fascia Kit	Spanish
FRU 2037103-080	CARESCAPE V100 Fascia Kit	Swedish
FRU 2037103-081	CARESCAPE V100 Fascia Kit	Lithuanian
FRU 2037103-082	CARESCAPE V100 Fascia Kit	Turkish



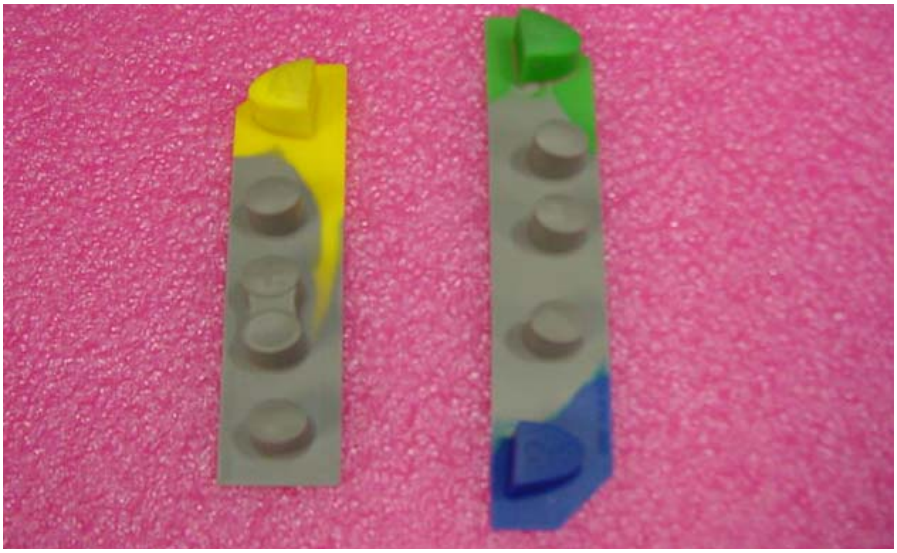
FRU 2037103-022: CARESCAPE V100 all hardware kit

NOTE

Each Hardware kit includes the following:

Item	Description	Torque specifications	Qty
1	Cable Tie, Locking, Nylon 6.6, 3.1" X 0.09”		5
2	Tie Wrap Intermediate, 2”		10
3	Screw, Mach Pnhd 832 X 2-1/2 SS Vibratite	8 in-lb ± 0.5 in-lb	6
4	Screw, No6, Torx Pan, 1.0 Inch Vib	8 in-lb ± 0.5 in-lb	4
5	Screw, No8, Pozi-Pan 0.75 in Vib	8 in-lb ± 0.5 in-lb	20
6	Screw, M3 X 12, Self-Tap, Torx	6 in-lb ± 0.5 in-lb	20
7	Screw, Self Tap,Torx, Zinc	6 in-lb ± 0.5 in-lb	23
8	Kit, Screwlock Female With Thread-Lock	6 in-lb ± 0.5 in-lb	3
9	Screw, Mach Pnhd Phil 440 X 3/16 SS Vibratite	3 in-lb ± 0.5 in-lb	20
10	Standoff Masimo SpO_2		4
11	Standoff Nellcor SpO_2		4
12	Standoff Ohmeda SpO_2		4
13	Wshr, #10 Fender Washer 1.00" OD Stainle		4
14	Spacer, Steel Zinc		20
15	Foot, Rnd, 12.7 Dia X 3.5 H Self Adhsv		20

Item	Description	Torque specifications	Qty
16	Tubing Silicone 1/8 ID X 1/4 OD		1 foot
17	Tubing Silicone Clear 3/32" ID 7/32" OD		1 foot
18	Conn Plastic Tee		4
19	Speaker Clamp Ring		3
20	Adhesive Backed Cable Tie Mount, 0.75 X 0.75		5
21	Extrusion Grommet, handle		3
22	Filter 40 Micron		10



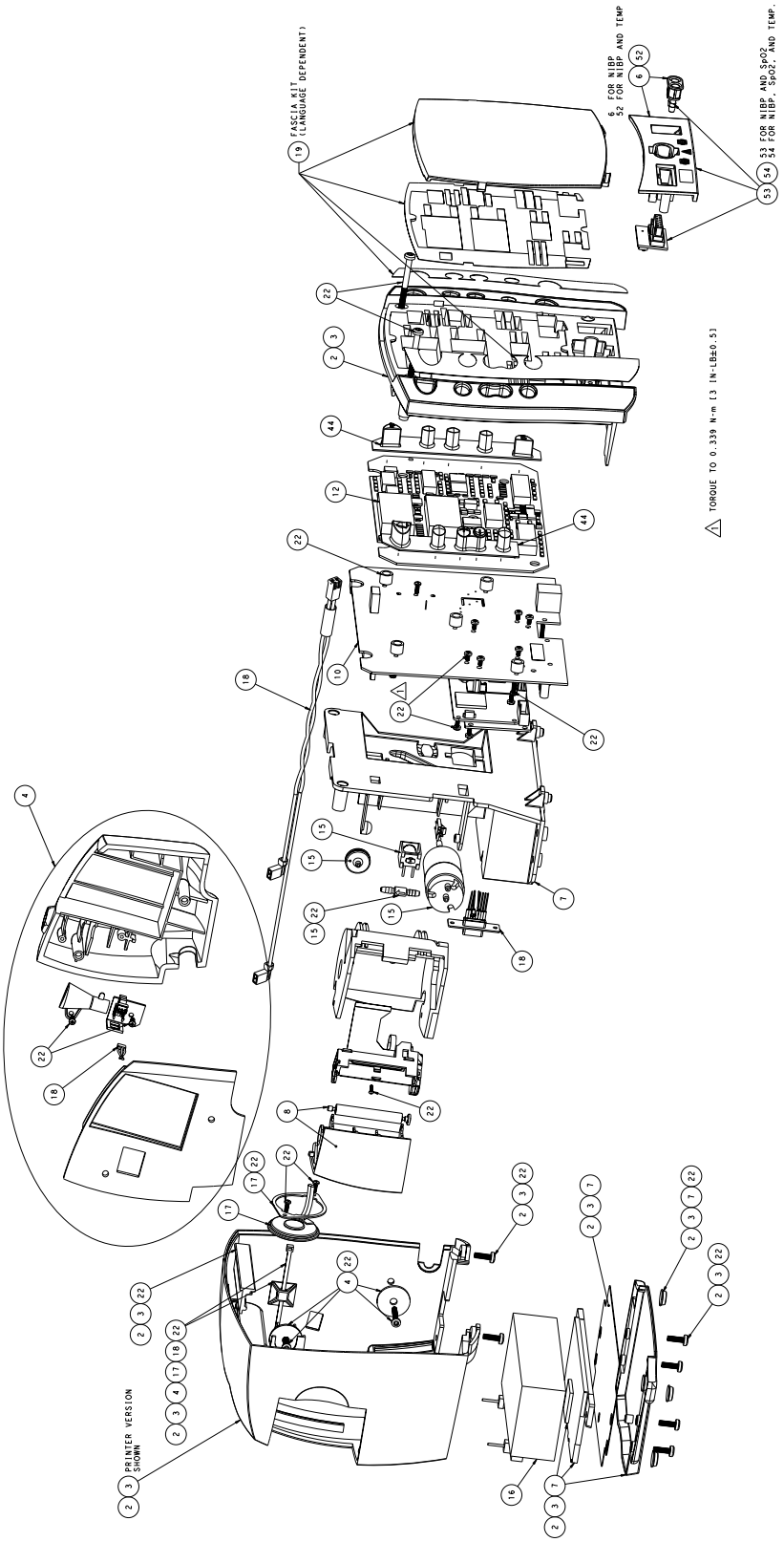
FRU 2037103-044: CARESCAPE V100 keypad kit

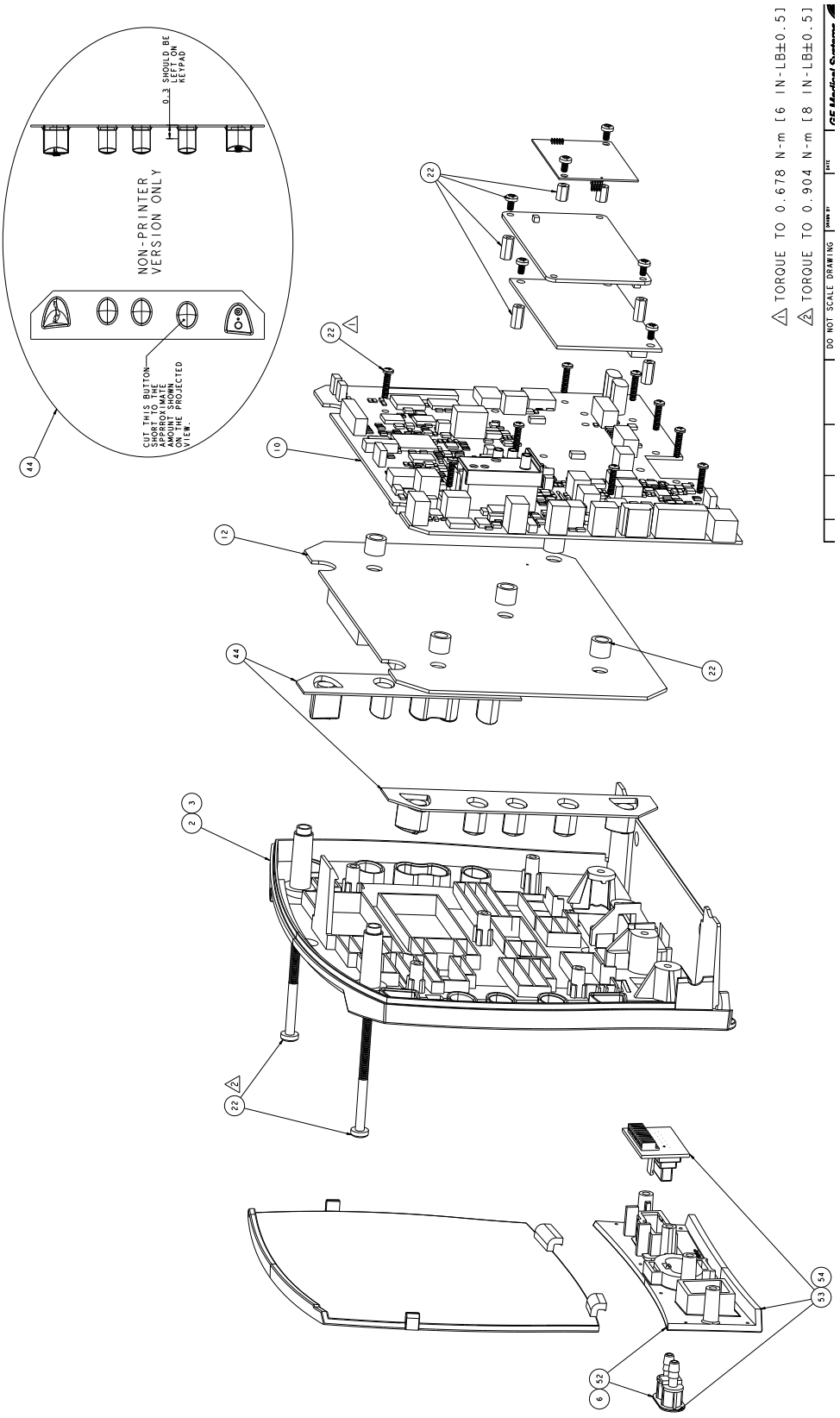
NOTE

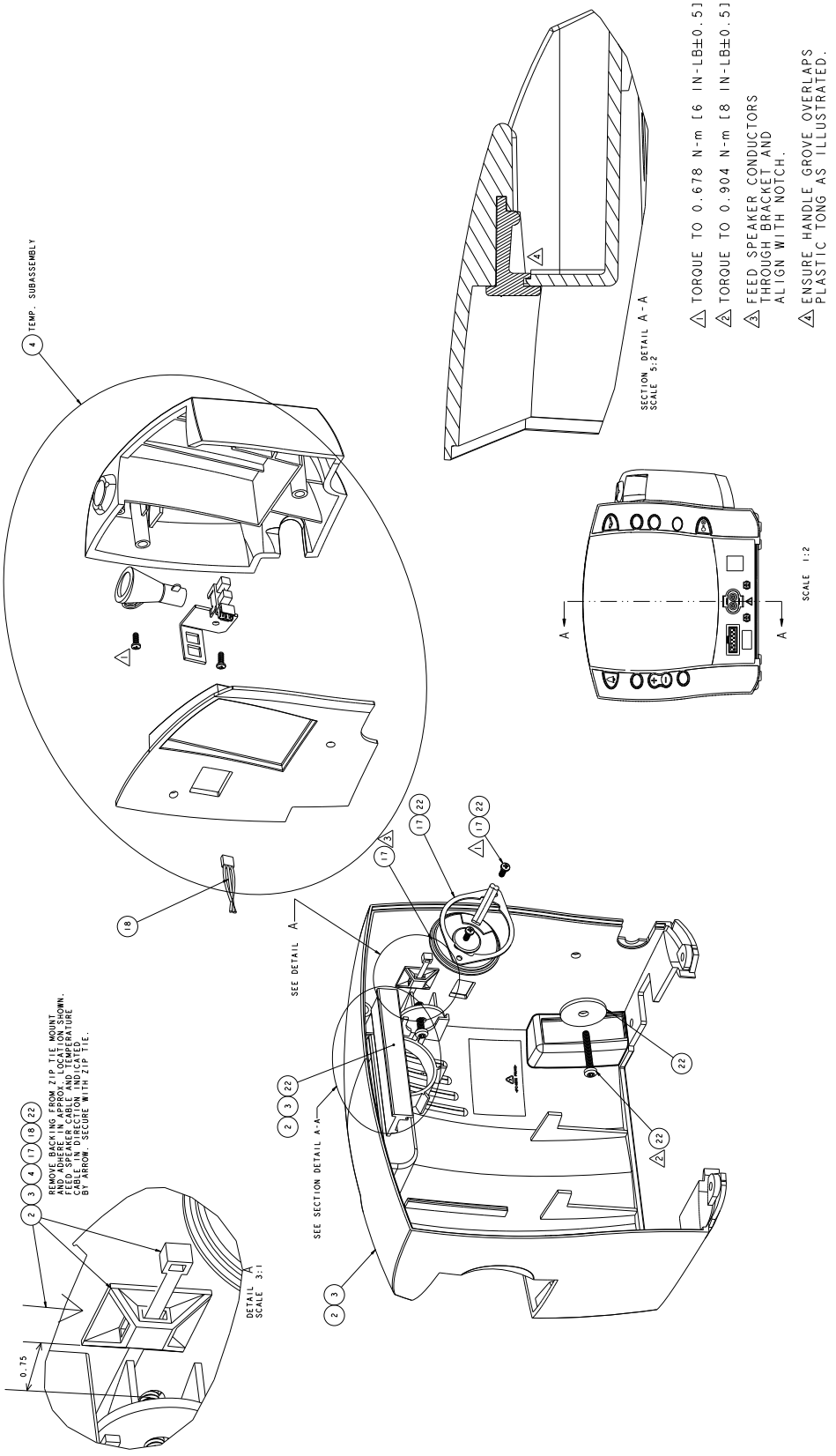
Printer version shown. For non-printer versions, the print key will need to be trimmed before installation. See parts drawing on page 6-29 for further details.

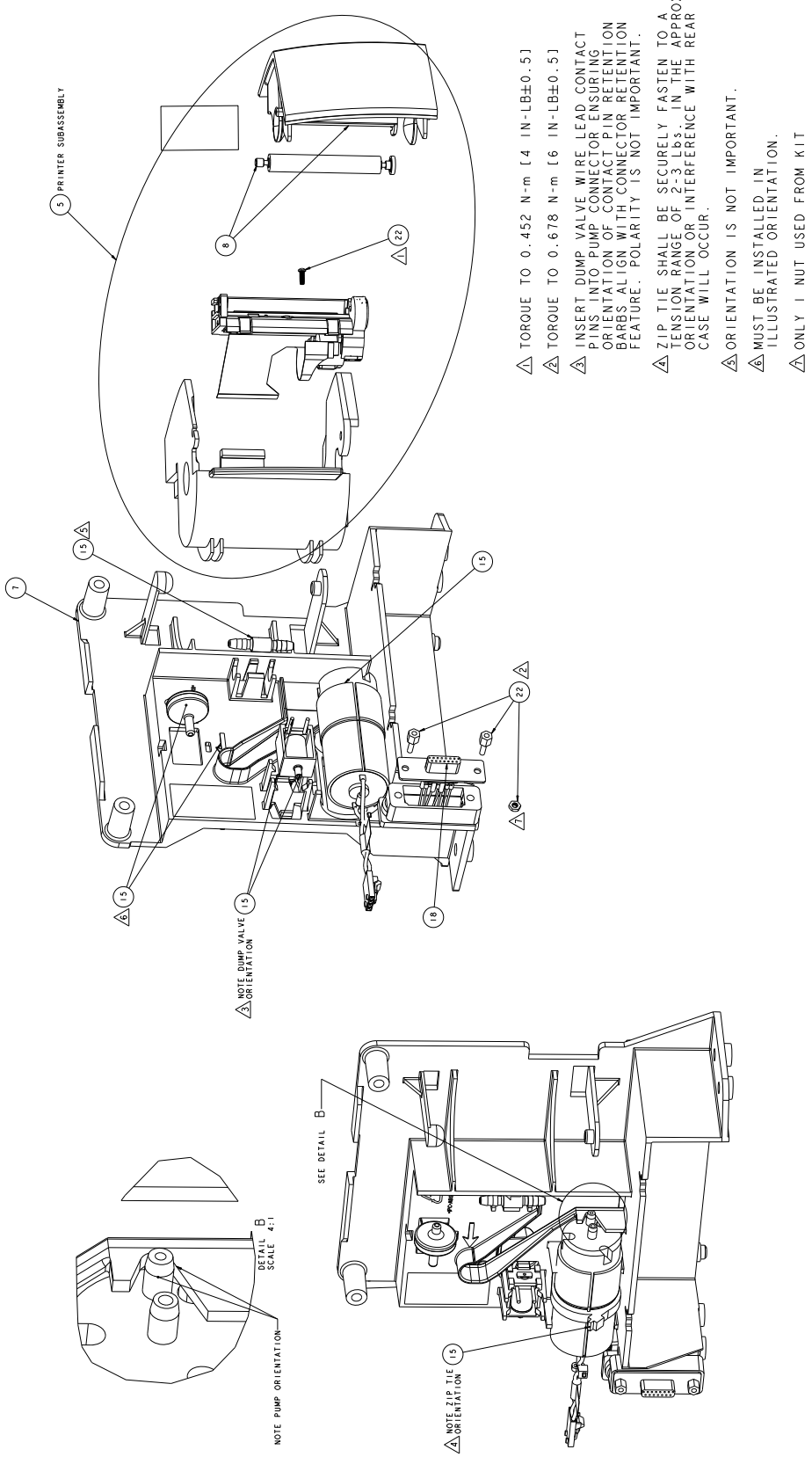
FRU main reference guide drawing

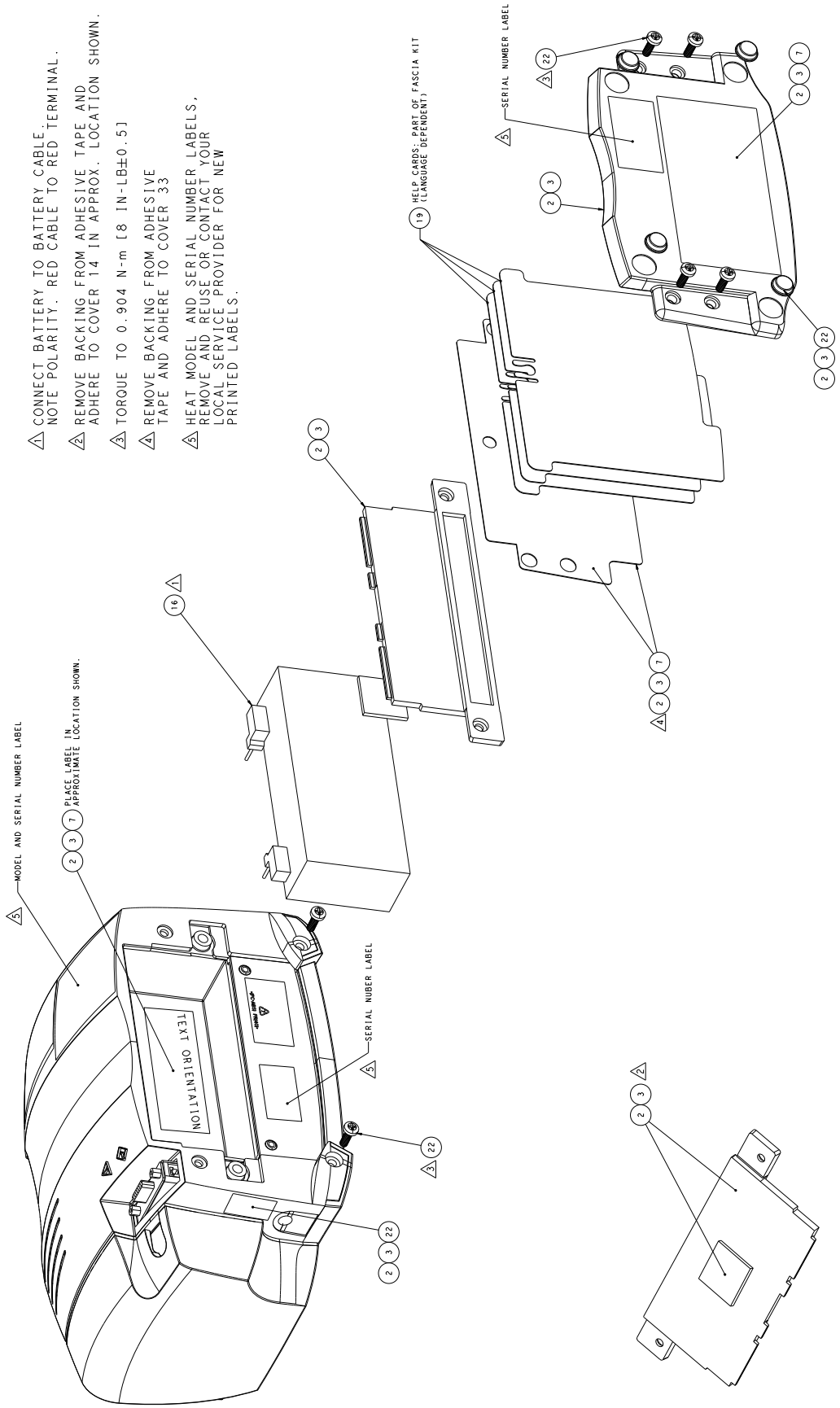
For quick reference use the following FRU main reference gui lrawing.

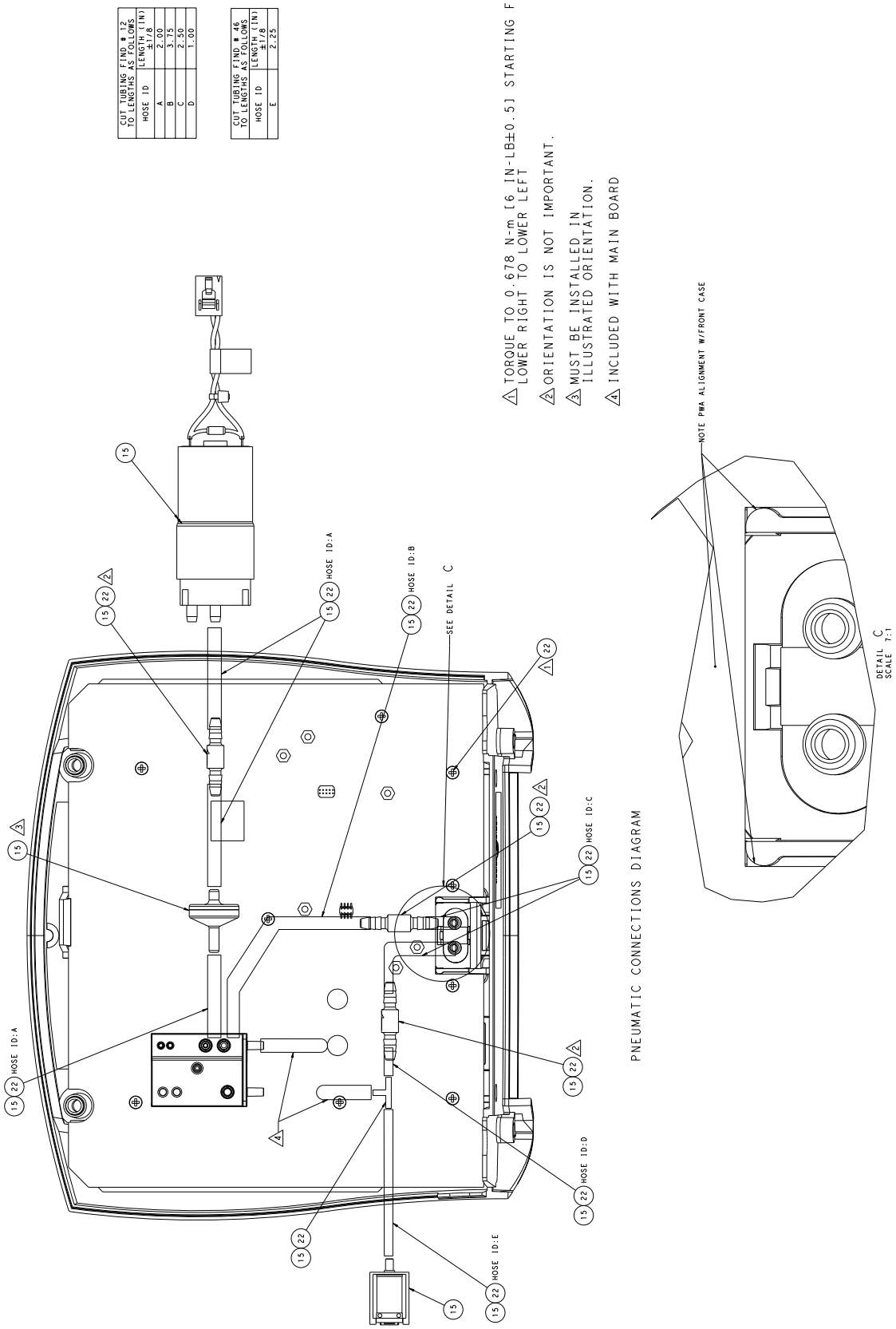

FASCIA KIT (LANGUAGE DEPENDENT)
6, FOR NIBP
52 FOR NIBP AND TEMP
53 FOR NIBP AND SpO2
54 FOR NIBP, SpO2, AND TEMP.
TORQUE TO 0.339 N-m [3 IN-LB±0.5]
PRINTER VERSION SHOWN

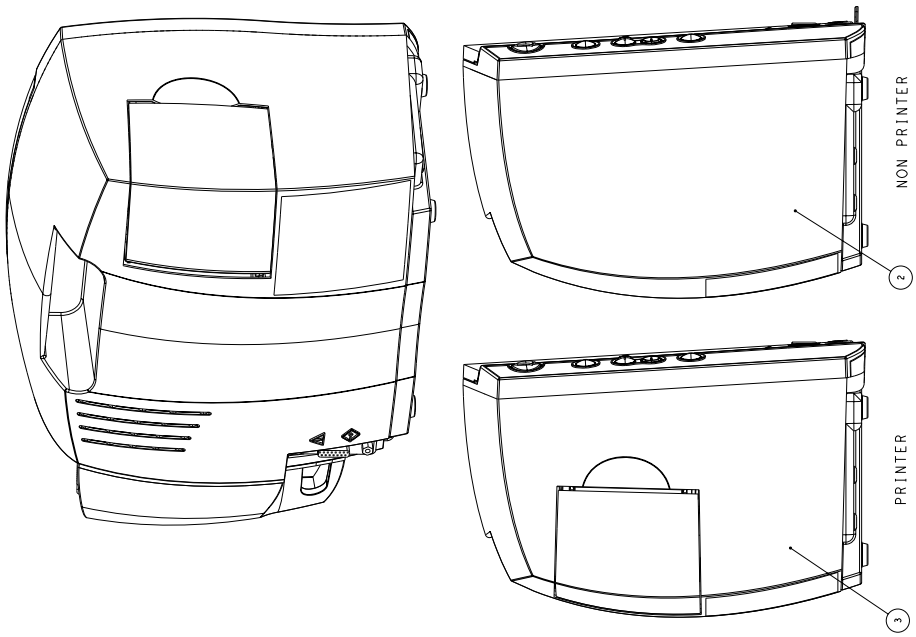

0.3 SHOULD BE LEFT ON KEYPAD
NON-PRINTER VERSION ONLY
CUT THIS BUTTON CAP OFF TO APPROXIMATE AMOUNT SHOWN ON THE PROJECTED VIEW.
44
22
10
12
2
3
53
54
52
6
△ TORQUE TO 0.678 N-m [6 IN-LB±0.5]
△ TORQUE TO 0.904 N-m [8 IN-LB±0.5]
DO NOT SCALE DRAWING

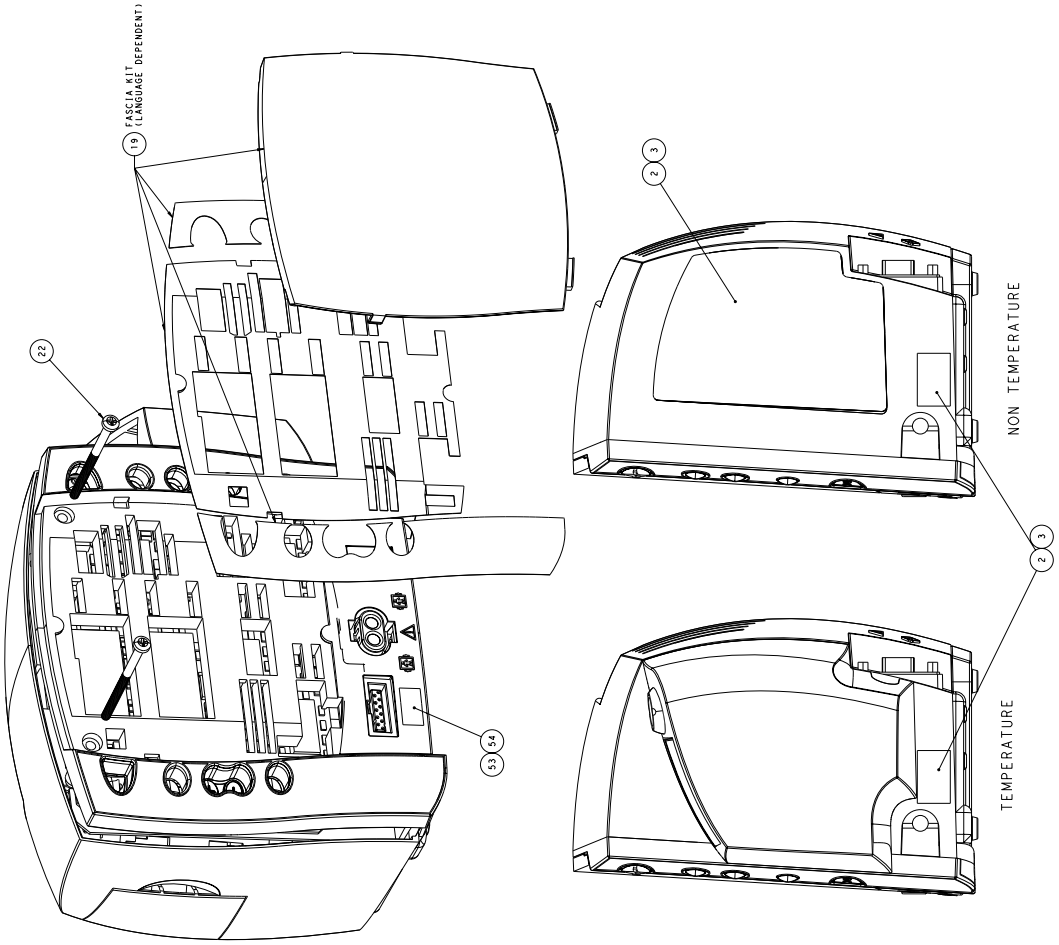

4 TEMP. SUBASSEMBLY
18
17
22
2 3 22
SEE DETAIL A
SEE SECTION DETAIL A-A
2 3
2 3 4 17 18 22
REMOVE BACKING FROM ZIP TIE MOUNT AND ADHERE IN APPROX LOCATION SHOWN. FEED SPEAKER CABLE AND TEMPERATURE CABLE IN DIRECTION INDICATED BY ARROW. SECURE WITH ZIP TIE.
0.75
DETAIL A SCALE 3:1
SECTION DETAIL A-A SCALE 5:2
SCALE 1:2
△1 TORQUE TO 0.678 N-m [6 IN-LB±0.5]
△2 TORQUE TO 0.904 N-m [8 IN-LB±0.5]
△3 FEED SPEAKER CONDUCTORS THROUGH BRACKET AND ALIGN WITH NOTCH.
△4 ENSURE HANDLE GROVE OVERLAPS PLASTIC TONG AS ILLUSTRATED.

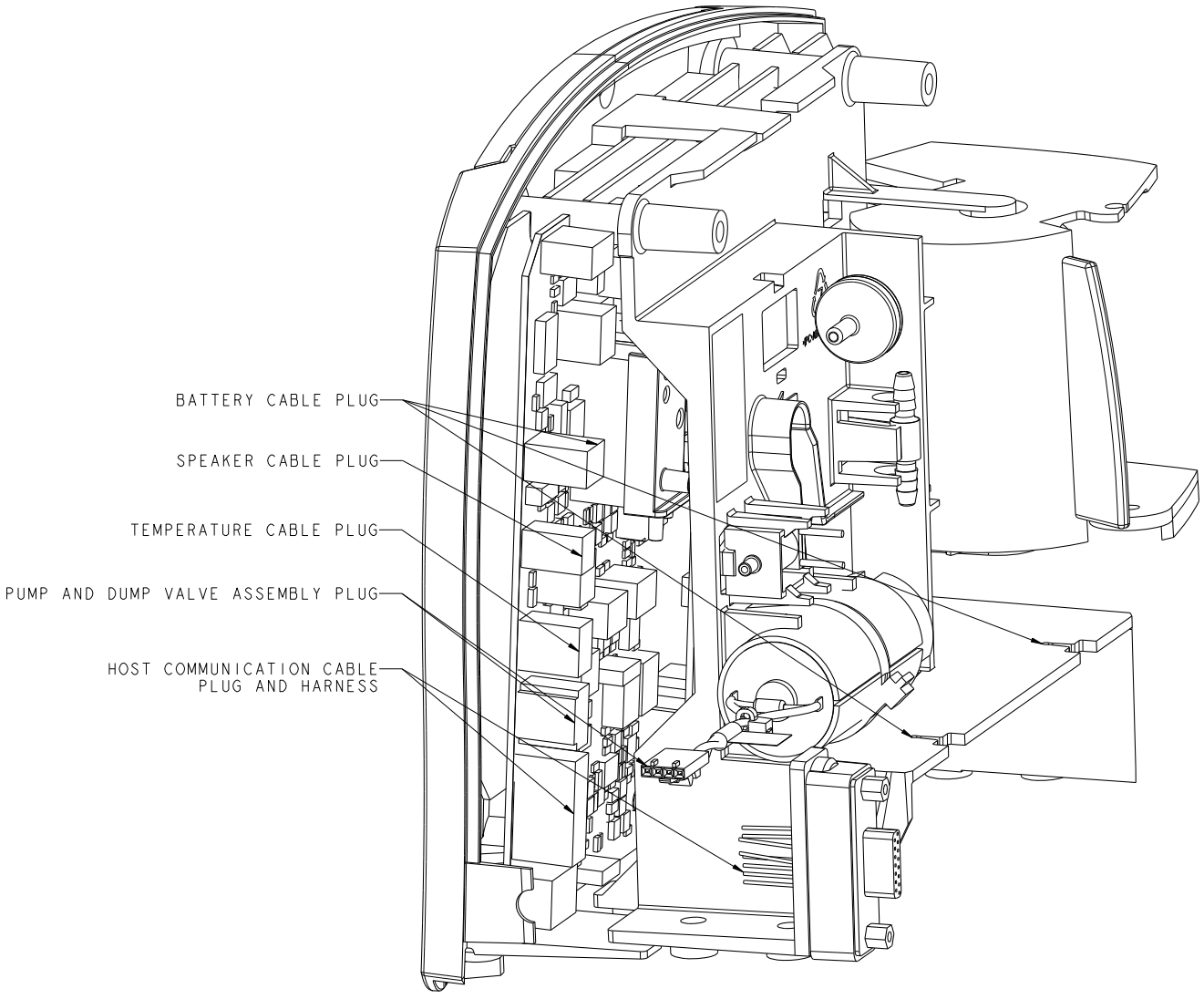

5 PRINTER SUBASSEMBLY
8
22
7
15
6
18
3 NOTE DUMP VALVE ORIENTATION
4 NOTE ZIP TIE ORIENTATION
SEE DETAIL B
DETAIL B
SCALE 4:1
NOTE PUMP ORIENTATION
1 TORQUE TO 0.452 N-m [4 IN-LB±0.5]
2 TORQUE TO 0.678 N-m [6 IN-LB±0.5]
3 INSERT DUMP VALVE WIRE LEAD CONTACT PINS INTO PUMP CONNECTOR ENSURING ORIENTATION OF CONTACT PIN RETENTION BARBS ALIGN WITH CONNECTOR RETENTION FEATURE. POLARITY IS NOT IMPORTANT.
4 ZIP TIE SHALL BE SECURELY FASTEN TO A TENSION RANGE OF 2-3 Lbs. IN THE APPROX. ORIENTATION OR INTERFERENCE WITH REAR CASE WILL OCCUR.
5 ORIENTATION IS NOT IMPORTANT.
6 MUST BE INSTALLED IN ILLUSTRATED ORIENTATION.
7 ONLY 1 NUT USED FROM KIT


1 CONNECT BATTERY TO BATTERY CABLE. NOTE POLARITY. RED CABLE TO RED TERMINAL.
2 REMOVE BACKING FROM ADHESIVE TAPE AND ADHERE TO COVER 14 IN APPROX. LOCATION SHOWN.
3 TORQUE TO 0.904 N-m [8 IN-LB±0.5]
4 REMOVE BACKING FROM ADHESIVE TAPE AND ADHERE TO COVER 33
5 HEAT MODEL AND SERIAL NUMBER LABELS, REMOVE AND REUSE OR CONTACT YOUR LOCAL SERVICE PROVIDER FOR NEW PRINTED LABELS.
MODEL AND SERIAL NUMBER LABEL
PLACE LABEL IN APPROXIMATE LOCATION SHOWN.
TEXT ORIENTATION
SERIAL NUBER LABEL
HELP CARDS: PART OF FASCIA KIT (LANGUAGE DEPENDENT)
SERIAL NUMBER LABEL


CUT TUBING FIND # 12 TO LENGTHS AS FOLLOWS
HOSE ID | LENGTH (IN) ±1/8
A | 2.00
B | 3.75
C | 2.50
D | 1.00
CUT TUBING FIND # 46 TO LENGTHS AS FOLLOWS
HOSE ID | LENGTH (IN) ±1/8
E | 2.25
1 TORQUE TO 0.678 N-m [6 IN-LB±0.5] STARTING FROM LOWER RIGHT TO LOWER LEFT
2 ORIENTATION IS NOT IMPORTANT.
3 MUST BE INSTALLED IN ILLUSTRATED ORIENTATION.
4 INCLUDED WITH MAIN BOARD
HOSE ID:A
HOSE ID:B
HOSE ID:C
HOSE ID:D
HOSE ID:E
SEE DETAIL C
NOTE PWA ALIGNMENT W/FRONT CASE
DETAIL C
SCALE 7:1
PNEUMATIC CONNECTIONS DIAGRAM


NON PRINTER
2
PRINTER
3


19 FASCIA KIT (LANGUAGE DEPENDENT)
22
53 54
2 3
NON TEMPERATURE
2 3
TEMPERATURE


BATTERY CABLE PLUG
SPEAKER CABLE PLUG
TEMPERATURE CABLE PLUG
PUMP AND DUMP VALVE ASSEMBLY PLUG
HOST COMMUNICATION CABLE PLUG AND HARNESS

Disassembly/reassembly of FRUs

Electrostatic discharge (ESD) precautions

All external connectors of the monitor are designed with protection from ESD damage. However if the monitor requires service, exposed components and assemblies inside are susceptible to ESD damage. This includes human hands, non-ESD protected work stations or improperly grounded test equipment.

The following guidelines may not guarantee a 100% static-free workstation, but can greatly reduce the potential for failure of any electronic assemblies being serviced:

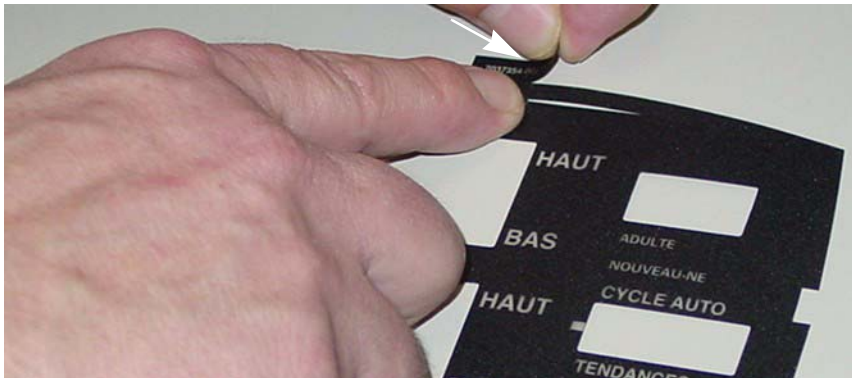
- Discharge any static charge you may have built up before handling assemblies containing semiconductors.
- A grounded, antistatic wristband (3M part number 2046 or equivalent) or heel strap should be worn at all times while handling or repairing assemblies containing semiconductors.
- Use properly grounded soldering and test equipment.
- Use a static-free work surface (3M part number 8210 or equivalent) while handling or working on assemblies containing semiconductors.
- *Do not* remove assemblies from antistatic containers (Velo-stat bags) until absolutely necessary.
- Make sure power to an assembly is turned off before removal.
- *Do not* slide electrical/electronic assemblies across any surface.
- *Do not* touch semiconductor leads unless absolutely necessary.
- Electronic assemblies should be stored only in antistatic bags or boxes.
- Handle all PCB assemblies by their edges.
- *Do not* flex or twist a circuit board.

Monitor fascia replacement procedure

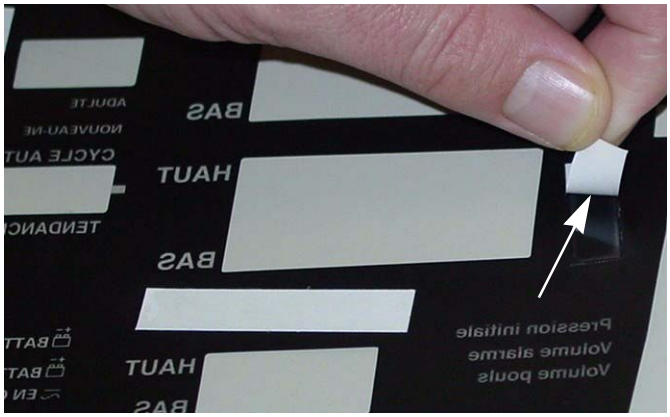
1. Pry open the front face plate at the upper corners and remove the face plate.

2. Remove the existing fascia.

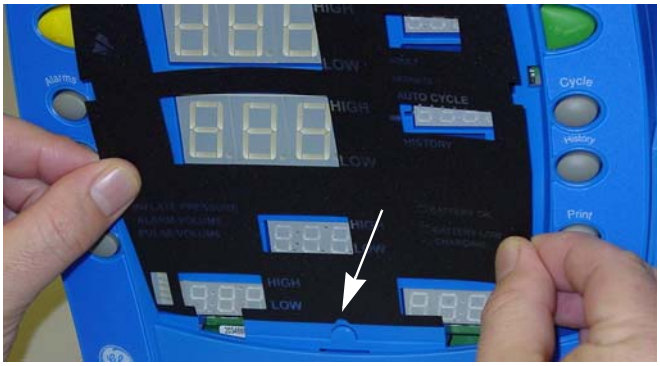
3. Remove the tab at the top of the new fascia that includes the part number.



4. Turn the fascia over and remove the protective liner from the three pieces of double-sided adhesive tape.



5. Turn the fascia right side up and align the fascia with the bottom notch on the monitor.



6. Press the fascia onto the monitor.
7. Tuck the top part of the fascia under the top notch on the monitor.

8. Place the tabs on the bottom edge of the face plate into the slots on the monitor.

9. Snap the face plate back on the monitor.

Monitor disassembly procedure

The following procedure is sequential (i.e., you must remove the main battery and rear case to remove the printer, etc.).

> CAUTION
> Internal electronic components are susceptible to damage by electrostatic discharge. To avoid damage when disassembling the monitor, observe the standard precautions and procedures for handling static-sensitive components.

Main battery

1. Remove 4 screws securing the instruction cards.

2. Remove the battery compartment door and adhesive pad.

3. The battery can now be removed.

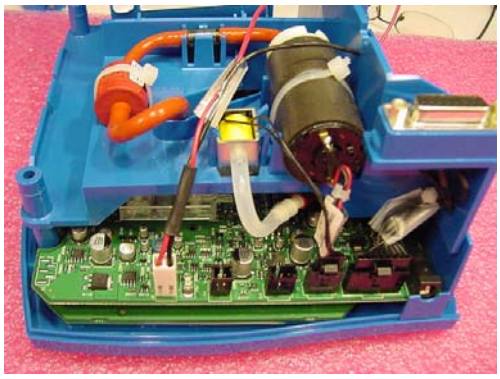
Rear case

1. Remove remaining two screws from the bottom of the monitor.
2. Set monitor upright.
3. Carefully remove the front faceplate.

4. Remove 2 screws behind black overlay.

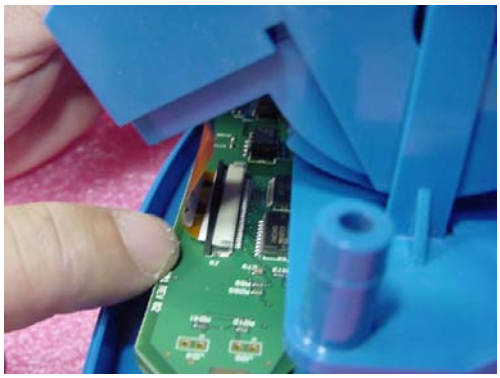
5. Set monitor on its face and open the printer door.
6. Carefully remove the rear case.

7. Unplug speaker cable and temperature module cable (if installed) from circuit board.

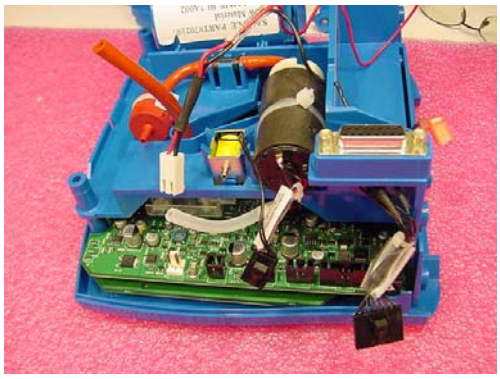


Printer

1. Lift the 2 black tabs and remove printer cable.

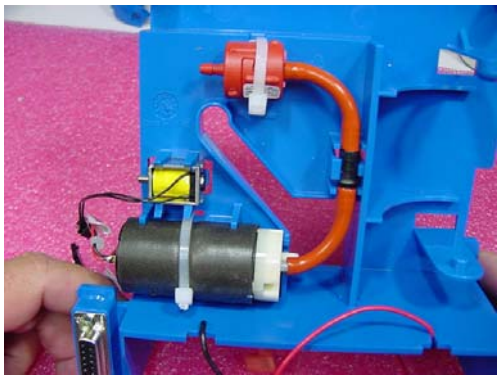


2. Remove printer assembly.
3. Unplug air hose from valve and filter.
4. Remove remaining 3 cable assemblies.



5. Locate and release retention tab and slide back sub chassis.

6. Remove sub-chassis and set aside.

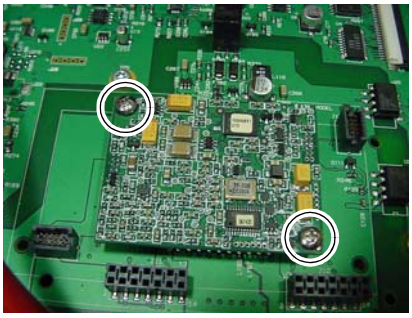


7. Remove pneumatic assembly from sub-chassis.

SpO_2 board

1. Remove 2 screws securing SpO_2 board.

   Threaded standoffs have screws on both ends.



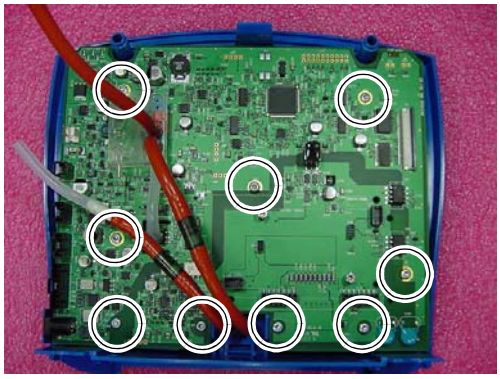
2. Remove SpO_2 board.

Front bezel

1. Remove 2 SpO_2 connector screws.
2. Unplug 2 pneumatic hoses from bezel.
3. Remove 4 torx-head screws along the bottom of main board.
4. Lift unit and remove bezel.

Main board

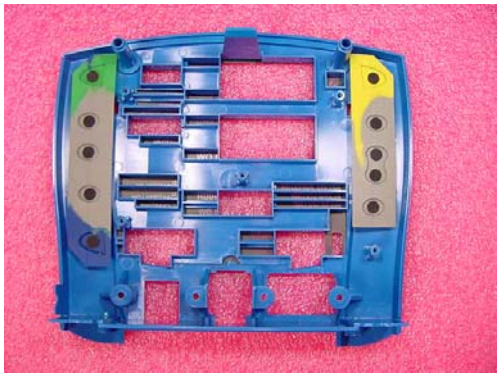
1. Remove 9 torx-head screws.



Display board

1. Carefully lift the Main board away from the UI board.

2. Collect the 5 spacers used to align the Main and UI board.
3. Lift the UI board away from the front panel.



4. The monitor is now completely disassembled.
5. Reverse the above sequence to reassemble the monitor.
6. Be careful not to pinch any cables or tubing during reassembly.

NOTE

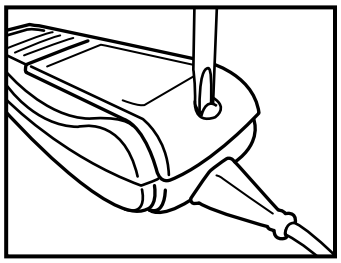
Updated Instructions may be included in your replacement parts kit. Always

review all material included in your kit.

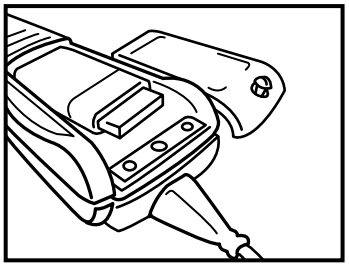
Exergen TAT

Cable replacement

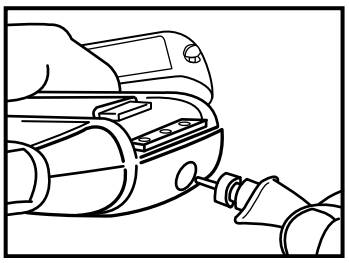
1. Turn off the monitor and unplug the cable from the host communication port on the back of the monitor.
2. On the back of the scanner, loosen the single screw at the bottom.



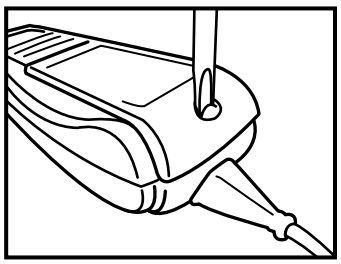
3. Remove the battery door.



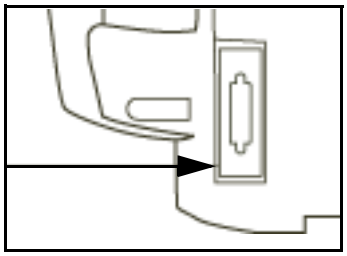
4. Remove the cable.



5. Install the replacement cable. Making sure both keyways line up, install male connector completely into the female jack inside the scanner.
6. Tighten the battery screw.



7. Screw the cable connector jack to the host communication port on the back of the monitor.



For your notes

A Technical specifications and default settings

Specifications

General

General specifications	
Mechanical	
Dimensions	
Height	19.5 cm (7.7 in)
Width	21.9 cm (8.6 in) without temperature 25.4 cm (10.0 in) with temperature
Depth	13.5 cm (5.3 in)
Weight (Including battery)	2.4 kg (5.4 lb)
Mountings	Self-supporting on rubber feet, pole mounted, or wall mount bracket
Portability	Carried by recessed handle
Power requirements	
Power converter universal	P/N: 2018859-001
Protection against electrical shock	Class II
AC input	100 to 240VAC, 0.5A
DC output voltage	12VDC at 1.0A The AC mains power adapter contains a nonresettable and nonreplaceable fuse.
Monitor	
Protection against electrical shock	Internally powered or Class II when powered from specified external power supply.
DC input voltage	12 VDC, supplied from a source conforming to IEC 60601-1.
Fuses	The monitor contains three fuses. The fuses are mounted within the monitor. The fuses protect the low voltage DC input, the main battery, and the remote alarm output. The +5 V output on the host port connector is regulated by internal supply.
Main Battery	Refer to "Battery" on page A-15
Environmental	
Operating temperature	+ 5°C to + 40°C (+ 41°F to + 104°F)
Operating atmospheric pressure	500 hPa to 1060 hPa

General specifications	
Storage/transportation	
Storage temperature	– 20°C to + 50°C (– 4°F to + 122°F)
Atmospheric pressure	500 hPa to 1060 hPa
Humidity range	5% to 95% noncondensing
Radio frequency	Complies with IEC Publication 60601-1-2 Medical Electrical Equipment, Electromagnetic Compatibility Requirements and Tests and CISPR 11 (Group 1, Class B) for radiated and conducted emissions

Printer

Printer specifications	
Printer type	Thermal dot array
Resolution	384 dots/inch horizontal
Paper type	The paper roll used by the printer must be compatible with GE PN 770137.
Languages printed	English, German, French, Italian, Spanish, Portuguese, Hungarian, Polish, Czech, Finnish, Swedish, Danish, Dutch, Norwegian, and Slovak
Languages not printed (text printed in English only)	Russian, Greek, Korean, Japanese, Turkish and Lithuanian

Alarms

Alarm specifications	
Alarm volume	60 dB to 75 dB
Remote alarm	The remote alarm signals an alarm in 0.5 seconds of the monitor's display of the alarm.

NIBP

WARNING
Use only GE CRITIKON blood pressure cuffs. The size, shape, and bladder characteristics can affect the performance of the instrument. Inaccurate readings may occur unless GE CRITIKON blood pressure cuffs are used.

NIBP specifications	
Cuff pressure range (Normal operating range)	0 to 290 mmHg (adult/ped) 0 to 145 mmHg (neonate)
Blood pressure accuracy (Classic and Auscultatory)	Meets ANSI/AAMI standard SP-10 (mean error ≤ 5 mmHg, standard deviation ≤ 8 mmHg)
Blood pressure accuracy (SuperSTAT)	Meets ANSI/AAMI standard SP-10 (mean error ≤ 5 mmHg, standard deviation ≤ 8 mmHg)
Maximum determination time	120 s (adult/ped) 85 s (neonate)
Overpressure cutoff	300 to 330 mmHg (adult/ped) 150 to 165 mmHg (neonate)
BP range (Classic and Auscultatory)	
Systolic	30 to 245 mmHg (adult/ped) 40 to 140 mmHg (neonate)
MAP	15 to 215 mmHg (adult/ped) 30 to 115 mmHg (neonate)
Diastolic	10 to 195 mmHg (adult/ped) 20 to 100 mmHg (neonate)
BP range (SuperSTAT)	
Systolic	30 to 290 mmHg (adult/ped) 30 to 140 mmHg (neonate)
MAP	20 to 260 mmHg (adult/ped) 20 to 125 mmHg (neonate)
Diastolic	10 to 220 mmHg (adult/ped) 10 to 110 mmHg (neonate)
Pulse rate range (Classic and Auscultatory)	30 to 200 beats/min (adult/ped) 30 to 220 beats/min (neonate)
Pulse rate range (SuperSTAT)	30 to 240 beats/min (adult/ped) 30 to 240 beats/min (neonate)
Pulse rate accuracy	± 3.5% or 3 bpm, whichever is higher

Ohmeda SpO_2

Ohmeda SpO2 specifications	
Measurement range	
SpO_2	1 to 100%
Pulse rate	30 to 250 bpm
Perfusion Index Value (Plr)	0.00 to 9.99
Accuracy*	
Saturation	
Adult*	70 to 100% ±2 digits, whichever is greater, (without motion)
Neonate*	70 to 100% ±3 digits (without motion)
Adult/Neonate**	70 to 100% ±3 digits (during clinical motion)
Low perfusion	70 to 100% ±2 digits (during clinical low perfusion)
Pulse rate	
Adult /Neonate	30 to 250 bpm: ± 2 digits or ± 2%, whichever is greater, (without motion) 30 to 250 bpm: ± 5 digits (during motion)
Low perfusion	30 to 250 bpm: ± 3 digits

*SpO_2 measurement accuracy is based on deep hypoxia studies using OxyTip++ sensors on healthy adult volunteer subjects. Arterial blood samples were analyzed simultaneously on multiple CO-oximeters. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

**Applicability: TS-AF sensors.

NOTE

Accuracy may vary for some sensors; always check the instructions for the sensor.

Specifications: Ohmeda sensor accuracy	
Sensor model	**SpO_2 range 70% to 100%**
OxyTip++	
TS-F-D	±2 digits without motion
TS-E-D	±3 digits without motion
TS-W-D	±2 digits without motion
TS-SE-3	±2 digits without motion
TS-AF-10	±2 digits without motion
TS-AF-25	±2 digits without motion
TS-F4-GE	±2 digits without motion
TS-F2-GE	±2 digits without motion
TS-E4-GE	±3 digits without motion
TS-E2-GE	±3 digits without motion

Specifications: Ohmeda sensor accuracy					
Sensor model	**SpO_2 range 70% to 100%**	**SpO_2 range 90% to 100%**	**SpO_2 range 80% to 90%**	**SpO_2 range 70% to 80%**	**SpO_2 range below 70%**
TS-SA4-GE	±2 digits	±1 digits	±2 digits	±3 digits	unspecified
TS-SA-D					

Specifications: Ohmeda sensor accuracy	
Sensor light source	
Wavelength*	Infrared: 930 to 950 nm (nominal) Red 650 to 670 nm (nominal)
Average power	< 1 mW
* Information about wavelength range can be especially useful to clinicians.	

Nellcor SpO_2

WARNING
Nellcor-labeled monitors are only compatible with Nellcor Oximax sensors and cables.

Nellcor SpO2 specifications	
Measurement range	
SpO_2	1 to 100%
Pulse rate	20 to 250 bpm
Perfusion range	0.03 to 20%
Accuracy	
Saturation	
Adult*	70 to 100% ±2 digits
Neonate*	70 to 100% ±3 digits
Low perfusion**	70 to 100% ±2 digits
Pulse Rate	
Adult and neonate	20 to 250 bpm ±3 digits
Low perfusion**	20 to 250 bpm ±3 digits

*Adult specifications are shown for OxiMax MAX-A and MAX-N sensors with the N-600. Saturation accuracy will vary by sensor type. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population. Accuracy is based on deep hypoxia studies on healthy adult volunteer subjects. Arterial blood samples were analyzed simultaneously on multiple CO-oximeters.
**Applicability: OxiMax MAX-A, MAX-AL, MAX-P, MAX-I, and MAX-N sensors.

Specifications: Nellcor sensor accuracy	
NOTE All Nellcor OxiMax sensors must be used with the NELL cable; the SCP-10 cable. RS-10 and Oxisensor II sensors are not compatible with the CARESCAPE V100 vital signs monitor.	
Sensor model	**SpO_2 range 70% to 100%**
OxiMax	
MAX-A, MAX-AL	± 2 digits
MAX-N (adult)	± 2 digits
MAX-N* (neonate)	± 3 digits
MAX-P	± 2 digits
MAX-I	± 2 digits
MAX-FAST	± 2 digits
SC-A (adult)	± 2 digits
SC-PR (neonate)	± 3 digits
SC-NEO	± 3 digits
MAX-R**	± 3.5 digits
OxiCliq	
OxiCliq A	± 2.5 digits
OxiCliq P	± 2.5 digits
OxiCliq N (adult)	± 2.5 digits
OxiCliq N* (neonate)	± 3.5 digits
OxiCliq I	± 2.5 digits
Reusable sensor models	
D-YS (infant to adult)	± 3 digits
D-YS (neonate)	± 4 digits

Specifications: Nellcor sensor accuracy	
D-YS & D-YSE	± 3.5 digits
D-YS & D-YSPD	± 3.5 digits
DS-100A	± 3 digits
OXI-A/N (adult)	± 3 digits
OXI-A/N (neonate)	± 4 digits
OXI-P/I	± 3 digits
Neonatal sensor accuracy	When sensors are used on neonatal subjects as recommended, the specified accuracy range is increased by ±1 digit, as compared to adult usage, to account for the theoretical effect on oximeter measurements of fetal hemoglobin in neonatal blood. For example, MAX-N accuracy on neonates is ±3 digits, rather than ±2 digits.
Sensor light source	
Wavelength***	Infrared: 890 nm (nominal) Red: 660 nm (nominal)
Power dissipation	Infrared: 22.5 mW (max) Red: 30 mW (max)

* The MAX-N, D-YS, OXI-A/N, and OxiCliq N were tested on patients >40 kg.

** The accuracy specification has been determined between saturations of 80%-100%.

*** Information about wavelength range can be especially useful to clinicians.

Masimo SpO_2

WARNING
Use only Masimo oximetry sensor for SpO_2 measurements. Other oxygen transducers (sensors) may cause improper SpO_2 performance.

WARNING
Monitors identified as having Masimo SET technology are compatible only with Masimo SET sensors and cables.

Masimo SpO_2 specifications	
Measurement range	
SpO_2	1 to 100%
Pulse rate	25 to 240 bpm
Perfusion range	0.02 to 20%
Accuracy and motion tolerance	
Saturation	
Without motion - adult/pediatric*	70 to 100% ± 2 digits
Without motion - neonate*	70 to 100% ± 3 digits
With motion - adult/pediatric/neo**†	70 to 100% ± 3 digits
Low perfusion‡	70 to 100% ± 2 digits 0 to 69% unspecified
Pulse rate	
Without motion	25 to 240 bpm ±3 digits
With motion	normal physiologic range 25 to 240 bpm ±5 digits

* The Masimo SET SpO_2 parameter with LNOP-Adt sensors has been validated for no motion accuracy in human blood studies on healthy adult volunteers in induced hypoxia studies in the range of 70-100% SpO_2 against a laboratory CO-oximeter and ECG monitor. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

**The Masimo SET SpO_2 parameter with LNOP-Adt sensors has been validated for motion accuracy in human blood studies on healthy adult volunteers in induced hypoxia studies while performing rubbing and tapping motions at 2 to 4 Hz at an amplitude of 1 to 2 cm and a nonrepetitive motion between 1 to 5 Hz at an amplitude of 2 to 3 cm in induced hypoxia studies in the range of 70-100% SpO_2 against a laboratory CO-oximeter and ECG monitor. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

†The Masimo SET SpO_2 parameter with LNOP-Neo Pt sensors has been validated for neonatal motion accuracy in human blood studies on neonates while moving the neonate's foot at 2 to 4 cm against a laboratory CO-oximeter and ECG monitor. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

‡The Masimo SET SpO_2 parameter has been validated for low perfusion accuracy in bench-top testing against a Biotek Index 2 simulator and Masimo's simulator with signal strengths of greater than 0.02% and a % transmission of greater than 5% for saturations ranging from 70 to 100%. This variation equals plus or minus one standard deviation. Plus or minus one standard deviation encompasses 68% of the population.

Specifications: Masimo sensor accuracy	
Sensor model	**SpO_2 range 70% to 100%**
LNOP	
LNOP ADT	± 2 digits without motion
LNOP NEO	± 3 digits without motion
LNOP NEO-L Foot Finger	 ± 3 digits without motion ± 2 digits without motion
LNOP NEO PT-L	± 3 digits without motion
LNOP Adtx	± 2 digits without motion
LNOP Pdtx	± 2 digits without motion
LNOP DCI	± 2 digits without motion
LNOP DCIP	± 2 digits without motion
LNOP Hi Fi-Neo/adult Foot Finger	 ± 3 digits without motion ± 2 digits without motion
LNOP Hi Fi-Infant/Ped	± 2 digits
LNOP Blue Infant Thumb/Toe*	± 3 digits (for 80-100) without motion ± 4 digits (for 60-80) without motion ± 3.3 digits (for 70-100) without motion
LNOP YI Multi-Site Foot/hand Finger/toe	 ± 3 digits without motion ± 2 digits without motion
LNOP DC-195	± 2 digits without motion
LNOP TC-I	± 3.5 digits without motion
LNCS TCI	± 3.5 digits without motion

Specifications: Masimo sensor accuracy	
LNCS DC-I	± 2 digits without motion
LNCS DC-IP	± 2 digits without motion
LNCS Adult Adtx	± 2 digits without motion
LNCS Ped Pdtx	± 2 digits without motion
LNCS Infant-L	± 2 digits without motion
LNCS Neo PT-L	± 3 digits without motion
Resolution	
Saturation (% SpO_2)	1%
Pulse rate (bpm)	1
Low perfusion performance	
0.02% Pulse amplitude and % transmission >5%	Saturation (% SpO_2) ±2 digits Pulse rate ±3 digits
Interfering substances	Carboxyhemoglobin may erroneously increase readings. The level of increase is approximately equal to the amount of carboxyhemoglobin present. Dyes, or any substance containing dyes, that change usual arterial pigmentation may cause erroneous readings.
Sensor light source	
Wavelength**	Infrared: 905 nm (nominal) Red: 660 nm (nominal)
Power dissipation	Infrared: 22.5 mW (max) Red: 27.5 mW (max)

*Masimo SET Technology with LNOP Blue sensors have been validated for no motion accuracy in human blood studies on neonatal, infant, and pediatric patients with congenital, cyanotic cardiac lesions in the range of 60% to 100% SpO_2 against a laboratory CO-oximeter. This variation equals plus or minus one standard deviation, which encompasses 68% of the population.
** Information about wavelength range can be especially useful to clinicians.

Temperature

WARNING
Alaris: Use only recommended probes and probe covers. The size, shape, and thermal characteristics of the probe covers can affect the performance of the instrument. Inaccurate readings may occur unless recommended probes and probe covers are used. Visually inspect the probe prior to use to be sure it is defect free. Please refer to the Accessories list provided with your monitor.

Temperature specifications		
Units of measure	°Fahrenheit (F) or °Celsius (C)	
Range		
Alaris		
	Predictive Mode	
	Turbo Temp	Max: 41.1°C; 106.0°F Min: 35.6°C; 96.0°F
	Tri-Site	Max: 41.1°C; 106.0°F Min: 35.0°C; 95.0°F
	Monitor Mode	
	Turbo Temp	Max: 42.1°C; 107.9°F Min: 26.7°C; 80.0°F
	Tri-Site	Max: 42.1°C; 107.9°F Min: 26.7°C; 80.0°F
	Turbo Temp and Tri-Site Continuous (monitor) mode accuracy	±0.1°C; ±0.2°F when tested in a calibrated liquid bath; meets ASTM E1112, Table 1, in range specified NOTE: If large changes occur in the ambient temperature, the temperature system can be recalibrated by cycling the monitor's power using the **On/Off** button.
	Determination time	
	Turbo Temp Oral or rectal	 As fast as 7 seconds
	Tri-Site Oral Rectal Axillary	 As fast as 12 seconds As fast as 11 seconds As fast as 13 seconds

Temperature specifications		
Exergen		
	Measurement Mode	Max: 43°C; 110°F Min: 16°C; 61°F
	Accuracy	±0.1°C; ±0.2°F meets EN 12470-5
	Predictive Mode	Not applicable
	Monitor Mode	Not applicable
	Operating environment	16° to 40°C; 60° to 104°F (ambient)
	Arterial head balance range for body temperature*	34.5° to 43°C; 94° to 110°F
	Resolution	0.1°C or 0.1°F
	Response time	approx. 0.04 seconds, typical
* Automatically applied when temperature is within normal body temperature range, otherwise reads surface temperature.		

Battery

Monitor - main battery

Battery specifications	
Capacity	6V; 3.3 Ahr sealed lead-acid battery
Battery life	5 hours *with* SpO_2 technology with a usage scenario of: ■ NIBP determinations every 5 minutes with adult cuff ■ Printout after every determination ■ SpO_2 parameter active at 60 bpm ■ Temperature parameter active in monitor mode Up to 11.5 hours *without* SpO_2 technology with a usage scenario of: ■ NIBP determinations every 15 minutes ■ Temperature parameter active
Charge time	Approx. 5 hours from full discharge when the monitor is off Approx. 8 hours when the monitor on

Exergen temporal scanner

Battery specifications	
Capacity	(1) 9V alkaline
Battery life	Approx. 15,000 readings (When scanning for 5 seconds and reading the temperature display for 2 seconds before turning thermometer off.)

Default settings

Alarms

The factory default for alarm volume is ***5***.

NIBP

	Adult/ped	**Neonate**	**Non-patient specific**
Systolic (mmHg)			
HIGH	***200***	***100***	
LOW	***80***	***40***	
Diastolic (mmHg)			
HIGH	***120***	***60***	
LOW	***30***	***20***	
Inflation pressure (for Auscultatory)	***160***	***100***	
Inflation pressure (for SuperSTAT)	***135***	***100***	
Inflation pressure (for Classic)	***160***	***110***	
Cycle button default			***15*** min

Ohmeda SpO_2

SpO_2 (%) ***HIGH*** alarm limit	***100***
SpO_2 (%) ***LOW*** alarm limit	***90***
Line frequency mode	***60*** (for 60 Hz)

Nellcor SpO_2

SpO_2 (%) ***HIGH*** alarm limit	***100***
SpO_2 (%) ***LOW*** alarm limit	***90***
Response mode	***1*** (for ***Mode 1***: Normal response)
SatSeconds	***0***

Masimo SpO_2

SpO_2 (%) ***HIGH*** alarm limit	***100***
SpO_2 (%) ***LOW*** alarm limit	***90***
Averaging time	***12*** seconds
FastSAT mode	***0*** (for Off)
Sensitivity mode	***2*** (for Low Perfusion)

Pulse rate

HIGH alarm limit	***150*** bpm
LOW alarm limit	***50*** bpm
Alarm volume	***5***

Temperature

Alaris

Unit of measure	***°F***
Temperature display time	***2*** minutes

Exergen

Unit of measure	***°F*** or ***°C*** Defined by Exergen scanner purchased.
Temperature display time	***2*** minutes

B Appropriate use of NIBP simulators

Appropriate use of NIBP simulators

NIBP accuracy

Noninvasive Blood Pressure (NIBP) monitors are cleared for sale in the U.S. by the FDA (1) and in Europe through the CE Mark. Both of these processes require that the accuracy of NIBP monitors be established through clinical testing - the use of NIBP simulators is not acceptable.

GE Healthcare has established accuracy using the AAMI SP-10 standard (2) and a similar standard exists in Europe (3). The AAMI standard specifies that the accuracy of NIBP monitors can be determined using either an invasive (intra-arterial) or noninvasive (auscultatory) blood pressure reference. Over the last 30 years, DINAMAP® accuracy has been established using an invasive central aortic blood pressure reference. More recently, the CARESCAPE V100 vital signs monitor has also been validated against a manual auscultatory reference.

Clinical vs. simulator readings

There are a number of reasons why the clinical studies are required for the measurement of NIBP accuracy. Many physiologic measurements (e.g., ECG, HR, eTCO2) can be taken with little interaction between the monitor and the patient. These devices can typically be validated using previously recorded patient data.

Unlike the transducers/electrodes used in these devices, the NIBP cuff has two functions. In addition to sensing the pressure pulses in the cuff, the cuff occludes and then releases the patient's artery to create the conditions that allow blood pressure to be measured.

An "artificial arm" would need to test both the sensing and occluding functions of the cuff, and mimic the nonlinear dynamics of the artery to provide an effective clinical simulation. While this has been attempted (4), there are no effective "arms" available.

Commercial NIBP simulators do attempt to test both functions of the NIBP cuff. Pressure signals are generated by the simulator in response to the inflation and deflation cycles of the monitor. While the cuff may be in the system, it is wrapped on a mandrel. The ability of the cuff to transducer pressure signals or to occlude the artery is not tested.

There are further limitations to the pressure pulses used by simulators. During the deflation of the cuff, the shape of the generated pressure oscillations changes as the cuff goes from systolic to diastolic pressures. This is due to the fact that the artery is only open when the arterial pressure is above cuff pressure. As can be seen in Figures 1A-1C, the shape of the oscillation changes as the cuff pressure changes, and the artery opens. Commercial NIBP simulators use one waveform shape at all pressure levels, which is simply scaled to reflect the oscillometric envelope.

In addition, the shape of the oscillation generated by commercial simulators does not match the shape of a typical oscillation measured during clinical testing (Figures 2A-2B). These differences in the shape of the pulses can effect

how an NIBP monitor analyzes the oscillometric envelope. While it is possible to develop an algorithm, which produces readings that correspond to the simulator settings, it is preferable to use the clinical data for algorithm development.

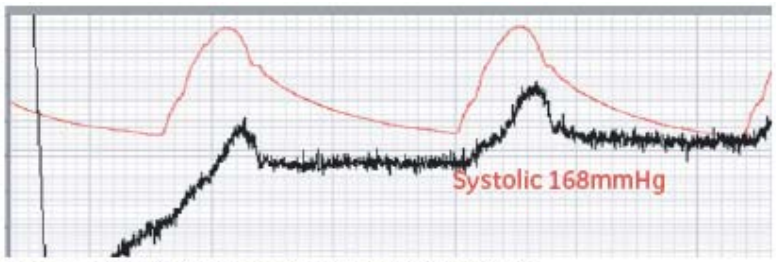


Figure 1A: Cuff Oscillation At Systolic Pressure
(— Invasive Pressure; — Cuff Pressure)

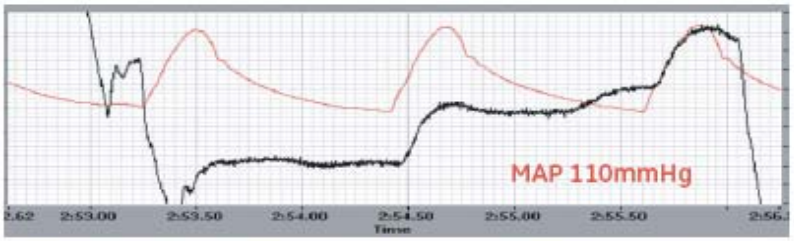


Figure 1B: Cuff Oscillation From A Clinical Measurement
(— Invasive Pressure; — Cuff Pressure)

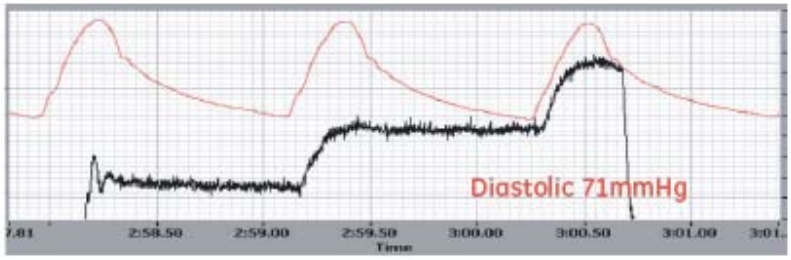


Figure 1C: Cuff Oscillation From A Clinical Measurement
(— Invasive Pressure; — Cuff Pressure)

What do simulator manufacturers say?

The DNI Nevada (Fluke Biomedical) CuffLink manual states:

"Since the CuffLink produces the same response independent of the inflate/deflate cycle or the algorithm used by the monitor, we offer the term "Target Value" as an approximation of the patient's actual blood pressure" (5)

BioTek® NIBP Pump 2™ (Fluke Biomedical) manual, in response to the question of why monitor readings differ from the target values on the simulator, states:

"Neither the monitor or the NIBP Pump 2 is broken. Some monitors were designed to give readings close to those obtained by the Auscultatory method of blood pressure determinations. Other monitors have been designed to agree with Invasive blood pressure readings. It is well known that Invasive and Auscultatory NIBP readings on the same subject can be quite different" (6)

Both of these statements indicate that these simulators cannot be used to demonstrate the accuracy of an NIBP monitor.

Why use simulators?

Simulators provide a method for producing repeatable signals that can be used to check that the monitor is responding to noninvasive blood pressure signals. Reference values obtained from a particular make and model of an NIBP monitor can be used to confirm that no changes have occurred after service to that same type of monitor.

Simulators can also be used to test for leaks and conduct static pressure calibration of NIBP monitors and as part of preventive maintenance programs.

Summary

The accuracy of an NIBP monitor can only be determined by comparison to a clinical blood pressure reference. NIBP simulators are useful for certain types of testing, but should not be used for accuracy testing.

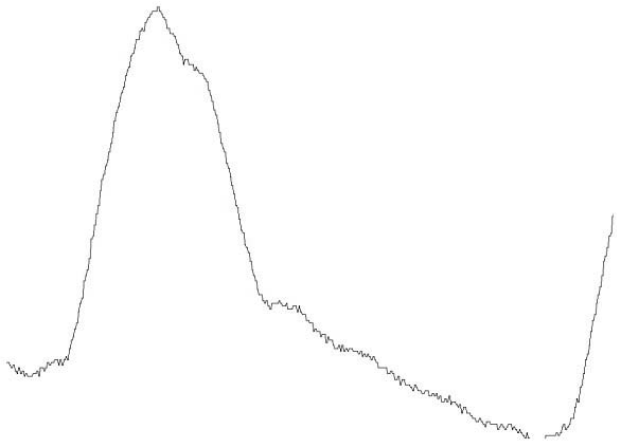


Figure 2A: Cuff oscillation from a clinical measurement

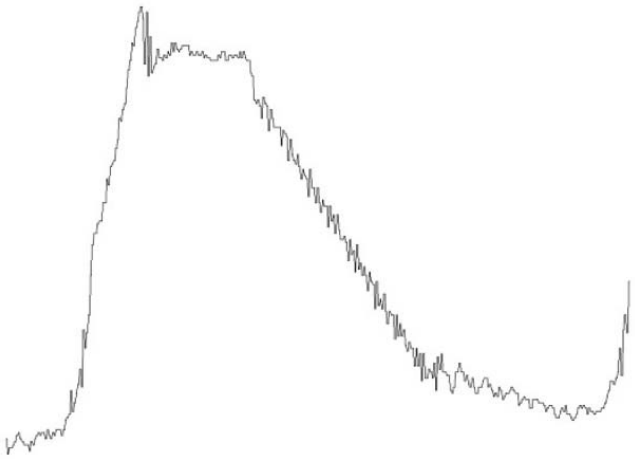


Figure 2B: Cuff Oscillation From A Simulator Measurement

References

1. FDA, CDRH, Non-Invasive Blood Pressure (NIBP) Monitor Guidance, March 10, 1997
2. ANSI/AAMI SP10:2002, Manual, Electronic or Automated Sphygmomanometers
3. EN 1060-4 2004 Specification for non-invasive sphygmomanometers - Part 4: Test procedures to determine the overall system accuracy of automated non-invasive sphygmomanometers
4. Mieke, S, Substitute of simulators for human subjects; Blood Press Monit, October 1, 1997; 2(5): 251-256
5. DNI Nevada CuffLink Non-Invasive Blood Pressure Analyzer, Operating and Service Manual; Revision E, 11/97
6. NIBP Pump 2 Noninvasive Blood Pressure Simulator and Tester, Operations Manual; Revision C, January 2003

For your notes

C Electromagnetic compatibility (EMC)

Electromagnetic compatibility (EMC): CARESCAPE V100 monitor

Changes or modifications to this system not expressly approved by GE Healthcare can cause EMC issues with this or other equipment. This system is designed and tested to comply with applicable regulation regarding EMC and must be installed and put into service according to the EMC information stated in this appendix.

CAUTION
Use of portable phones or other radio frequency (RF) emitting equipment near the system may cause unexpected or adverse operation.

CAUTION
The equipment or system should not be used adjacent to, or stacked with, other equipment. If adjacent or stacked use is necessary, the equipment or system should be tested to verify normal operation in the configuration in which it is being used.

Guidance and manufacturer's declaration – electromagnetic emissions

The CARESCAPE V100 vital signs monitor is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE V100 vital signs monitor is used in such an environment.

Emissions test	Compliance	Electromagnetic environment – guidance
RF Emissions EN 55011	Group 1	The equipment uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions EN 55011	Class B	The equipment is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration – electromagnetic immunity

The CARESCAPE V100 vital signs monitor is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE V100 vital signs monitor is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/Burst IEC 61000-4-4	± 2 kV for power supply lines ±1 kV for input/output lines	± 2 kV for power supply lines ±1 kV for input/ output lines	Mains power should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_t (>95% dip in U_t) for 0.5 cycles <40% U_t (>60% dip in U_t) for 5 cycles <70% U_t (>30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 s	<5% U_t (>95% dip in U_t) for 0.5 cycles <40% U_t (>60% dip in U_t) for 5 cycles <70% U_t (>30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 s	Mains power should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an uninterruptible power supply or a battery.
Power Frequency (50/ 60 Hz) Magnetic Field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristics of a typical location in a typical commercial or hospital environment.

NOTE:

U_t is the AC mains voltage prior to application of the test level.

Guidance and manufacturer's declaration – electromagnetic immunity

The CARESCAPE V100 vital signs monitor is intended for use in the electromagnetic environment specified below. It is the responsibility of the customer or user to assure that the CARESCAPE V100 vital signs monitor is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 KHz to 80 MHz	3 V rms	Portable and mobile RF communications equipment should not be used closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1.2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.33\sqrt{P}$ 800 MHz to 2.5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer, and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by reflection from structures, objects, and people.

[a]Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the equipment.

[b]Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances

The table below provides the recommended separation distances (in meters) between portable and mobile RF communications equipment and the CARESCAPE V100 vital signs monitor.

The CARESCAPE V100 vital signs monitor is intended for use in the electromagnetic environment on which radiated RF disturbances are controlled. The customer or the user of the CARESCAPE V100 vital signs monitor can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CARESCAPE V100 vital signs monitor as recommended below, according to the maximum output power of the communications equipment.

	Separation distance in meters (m) according to frequency of transmitter		
Rated maximum output power of transmitter in watts	**150 kHz to 80 MHz** [a] $d = 1.2\sqrt{P}$	**80 MHz to 800 MHz** [a] $d = 1.2\sqrt{P}$	**800 MHz to 2.5 GHz** [a] $d = 2.33\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
[a]At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			

For transmitters rated at a maximum output power not listed above, the recommended separation distance [*d*] in meters (m) can be estimated using the equitation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE:

These guidelines may not apply in all instances. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Compliant cables and accessories

CAUTION
The use of accessories, transducers and cables other than those specified may result in increased emissions or decreased immunity performance of the equipment or system.

The table below lists cables, transducers, and other applicable accessories with which GE Healthcare claims EMC compliance.

NOTE:
Any supplied accessories that do not affect EMC compliance are not included.

Part number	Description	Maximum lengths
Temperature cables and probes		
2008774-001	Alaris Turbo Temp Oral Probe, White cord, Blue	3.0 m / 10 ft
2008775-001	Alaris Turbo Temp Rectal Probe, White cord, Red	3.0 m / 10 ft
2041178-001	Alaris Sensor Tri-Site Oral Probe, White Cord (Blue)	3.0 m / 10 ft
2041179-001	Alaris Sensor Tri-Site Rectal Probe, White Cord (Red)	3.0 m / 10 ft
2044860-001	Exergen TAT-5000, default °F, arterial reference (DINAMAP version)	Not specified
2044860-002	Exergen TAT-5000, default °C, arterial reference (DINAMAP version)	Not specified
2044860-003	Exergen TAT-5000, default °C, oral reference (DINAMAP version)	Not specified
2044860-004	Exergen TAT-5000, default °F, oral reference (DINAMAP version)	Not specified
2044860-005	Cable, Exergen TAT-5000 to V100 interface	2.4 m / 8 ft
Oximetry cables and sensors		
70124033	Nellcor Multisite Sensor, D-YS, Reusable	Not specified
70124021	Nellcor DuraSensor Reusable Finger Probe (DS100A)	1.0 m / 3.3 ft
2021406-001	Cable Assy SpO_2 Nellcor OxiMax - Smart	3.0 m / 10 ft
2021406-002	Cable Assy SpO_2 Nellcor OxiMax - Smart	1.2 m / 4 ft
407705-005	SpO_2 Sensor, Max-R, Adhesive, Nasal, 24/box	Not specified
70124026	SpO_2 Sensor, Max-I Infant, Adhesive, Sensor, 24/box	Not specified
70124032	SpO_2 Sensor, Max-N Neonate Foot Adhesive Sensor, 24/box	Not specified
70124022	SpO_2 Sensor, Max-P Pediatric Finger Adhesive Sensor, 24/box	Not specified
70124027	SpO_2 Sensor, Max-A Adult Finger Adhesive Sensor, 24/box	Not specified

Part number	Description	Maximum lengths
2028117-001	SpO_2 Sensor, Max-AL Adult Long Finger Adhesive Sensor, 24/box	Not specified
414248-001	OXIBAND (OXI-P/I) Pediatric/Infant Sensor	Not specified
414248-002	OXIBAND (OXI-A/N) Adult/Pediatric Sensor	Not specified
2017002-001	Masimo LNOP, SpO_2 cable assembly	3.6 m / 12 ft
2017002-003	Masimo LNOP, SpO_2 cable assembly	2.4 m / 7.9 ft
2002800-001	Masimo LNOP Reusable Finger Sensor LNOP/DCI Adult	1.0 m / 3.3 ft
2027263-002	Masimo LNC-10 cable assembly	3.0 m / 10 ft
2002799-001	Masimo LNOP Reusable Finger Sensor LNOP/DCI Pediatric	1.0 m / 3.3 ft
2027258-001	Masimo LNCS Reusable Adult Sensor	Not specified
2010458-001	Masimo Disp Adhesive Sensor, LNOP-ADT. Adult (20/box)	Not specified
2010459-001	Masimo Disp Adhesive Sensor, LNOP-PDT. Pediatric (20/box)	Not specified
2010461-001	Masimo Disp Adhesive Sensor, LNOP-NeoPT. Neonatal (20/box)	Not specified
2010460-001	Masimo Disp Adhesive Sensor Bridge, LNOP-NEO. Neonatal (20/box)	Not specified
2017089-001	Masimo Disp Adhesive Sensor, LNOP-Neo-L. Neonatal (20/box)	Not specified
2017090-001	Masimo Disp Adhesive Sensor, LNOP-NeoPT-L. Neonatal (20/box)	Not specified
2027269-001	Masimo Disp Adhesive Sensor Transparent Tape LNOP, Adult (20/box)	Not specified
2027270-001	Masimo Disp Adhesive Sensor Transparent Tape LNOP, Pediatric (20/box)	Not specified
2027271-001	Masimo LNOP Disposable LNOP Hi Fi Sensor Neonatal/Adult (20/box)	Not specified
2027272-001	Masimo LNOP Disposable LNOP Hi Fi Sensor Neonatal/Adult (20/box)	Not specified
2027273-001	Masimo LNOP Disposable LNOP Blue Infant Thumb/Toe Sensor (20/box)	Not specified
2010463-001	Masimo LNOP Reusable Multisite Sensor LNOP-YI	Not specified
2027274-001	Masimo LNOP Reusable Tip-Clip Ear Sensor LKNOP TC-I	Not specified
2009745-001	Masimo LNOP Reusable Finger Sensor Adult DC-195	Not specified
2027259-001	Masimo LNCS DC-IP Reusable Pediatric Sensor	Not specified
2027261-001	Masimo LNCS TC-I TipClip Reusable Ear Sensor	Not specified
2027253-001	Masimo LNCS Adult Adhesive Sensor, 20/box	Not specified
2027254-001	Masimo LNCS Pediatric Adhesive Sensor, 20/box	Not specified
2027255-001	Masimo LNCS Infant Adhesive Sensor, 20/box	Not specified
2027256-001	Masimo LNCS Neonatal Adhesive Sensor, 20/box	Not specified
2027257-001	Masimo LNCS Neonatal PT Adhesive Sensor, 20/box	Not specified
TS-F-D	TruSignal Finger Sensor	1.0 m / 3.3 ft

Part number	Description	Maximum lengths
TS-E-D	TruSignal Ear Sensor	1.0 m / 3.3 ft
TS-W-D	TruSignal Wrap Sensor	1.0 m / 3.3 ft
TS-SE-3	TruSignal Sensitive Skin Sensor	1.0 m / 3.3 ft
TS-AF-10	TruSignal AllFit Sensor, 10/box	0.5 m / 1.6 ft
TS-AF-25	TruSignal AllFit Sensor, 25/box	0.5 m / 1.6 ft
TS-G3	TruSignal Interconnect cable with GE connector	3.0 m / 9.8 ft
TS-F4-GE	TruSignal Finger Sensor with integrated cable, 4 m	4.0 m / 13.1 ft
TS-F2-GE	TruSignal Finger Sensor with integrated cable, 2 m	2.0 m / 6.6 ft
TS-E4-GE	TruSignal Ear Sensor with integrated cable, 4 m	4.0 m / 13.1 ft
TS-E2-GE	TruSignal Ear Sensor with integrated cable, 2 m	2.0 m / 6.6 ft
TS-SA4-GE	TruSignal Soft Adult Sensor with integrated cable and GE connector, 4 m	4.0 m / 13.1 ft
TS-SA-D	TruSignal Soft Adult Sensor with integrated cable and D connector, 1 m	1.0 m / 3.3 ft
Accessories		
405535-002	Power supply cord, hospital grade (US) 10A 125V	3.7 m / 12 ft
405535-014	Power supply cord, Japan ST-ST PSE 10A 250V 12FT	3.7 m / 12 ft
401855-101	Power supply cord, continental Europe 10A 250V	2.5 m / 8.2 ft
401855-102	Power supply cord, British 10A 250V	2.5 m / 8.2 ft
401855-103	Power supply cord, Italian 10A 250V	2.5 m / 8.2 ft
401855-110	Power supply cord, Australian 10A 250V	2.5 m / 8.2 ft
401855-108	Power supply cord, Indian 10A 250V	2.5 m / 8.2 ft
2018859-001	Universal AC/DC adapter	Not specified
2018859-004	Universal AC/DC adapter (Japan only; PSE-marked)	Not specified
001926	Isolated Level Converter, ILC 1926	Not specified
001931	Isolated Level Converter, ILC 1931	Not specified
001932	Isolated Level Converter, ILC 1932	Not specified
2024500-001	Patient ID IR Cable	Not specified
487208CR	DINAMAP Compact Remote Alarm Cable	Not specified
418497-002	Cable Assy, Telemetry Interface, Dinalink	1.8 m / 6 ft
683235	Cable Assy, Dinamap PLUS / Compact to V-link transmitter, EX	165 cm
683242	Cable Assy, ILC to PC	3.0 m / 10 ft
2040229-001	USB cable kit, DINAMAP to PC	1.8 m / 6 ft

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